

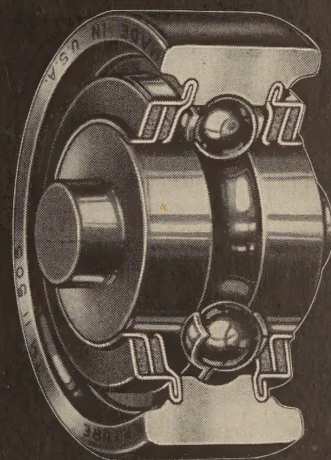
ents—p. 73
 er Design—p. 78
 aling Stainless—p. 84
 ing Ford Axles—p. 96
 Aims Outlined—p. 127
 Outlook Improved—p. 129
 arison of Prices—p. 158

The

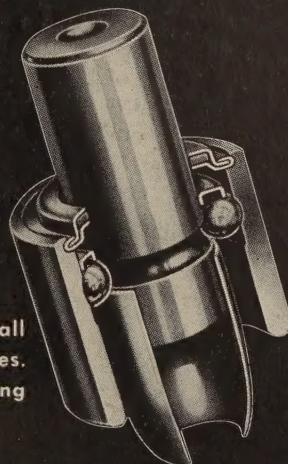
IRON AGE

SEPTEMBER 23, 1948

126 Million **Self-Sealed** New Departure Ball Bearings Can't be Wrong



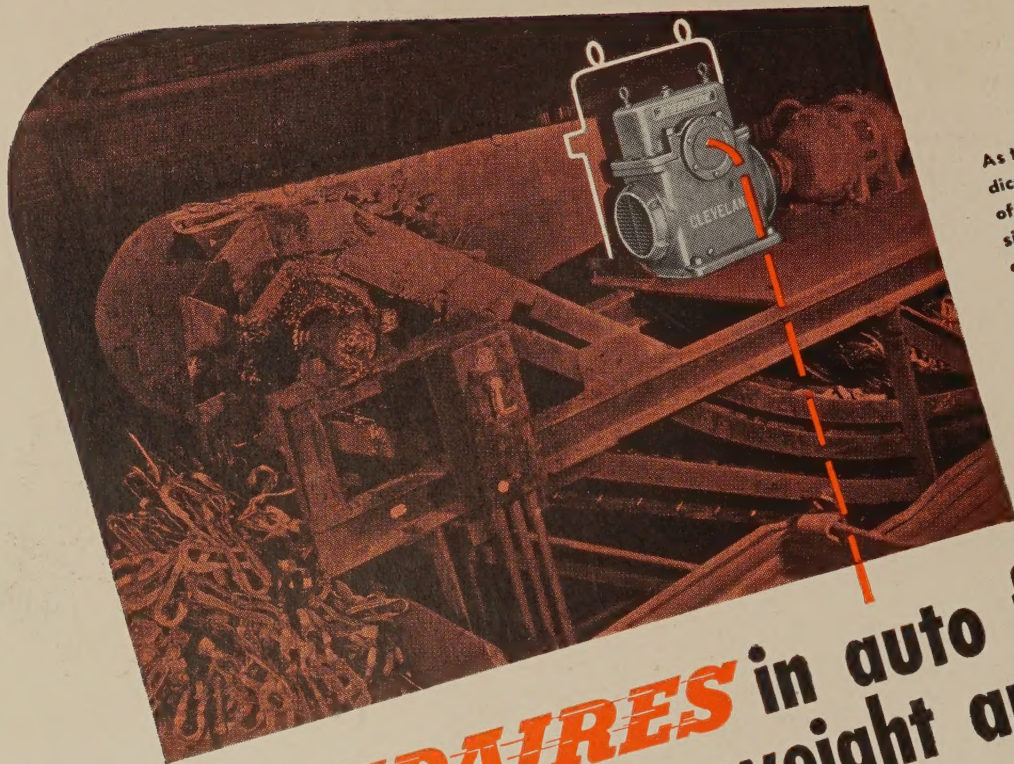
Treadle Roll Ball Bearing
 built for Draper Looms.
 Sealed and lubricated for
 life. For more facts, ask for
 booklet "Sealed."



Vertical Tension Pulley Ball
 Bearing for textile machines.
 Has own built-in circulating
 oiling system.

Originated, developed and Built to be forgotten
 by **NEW DEPARTURE**
nothing rolls like a ball

NEW DEPARTURE • Division of GENERAL MOTORS • BRISTOL, CONNECTICUT



As the white outline indicates, a standard unit of much greater frame size would be required to do the work of Speedaire.

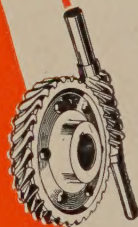
13 **SPEEDAIRES** in auto forge shop save money, weight and space

THIRTEEN Speedaires are at work in this auto forge shop. Three drive cold scrap trim conveyors, two operate scrap rattlers, and eight drive cold billet conveyors. For each application, Speedaire offered three big advantages—a saving in cost, a saving in weight, and a saving in space occupied. The unit shown here, driving a scrap conveyor, weighed 25% less, took 40% less space than a conventional worm-gear unit required to do the work, and saved \$84.50.

Speedaire is Cleveland's new fan-cooled worm-gear speed reducer. Because it is fan-cooled, Speedaire will do more work—will deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds. It can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle drive. Speedaire gives the same long, trouble-free service characteristic of all Clevelands.

For full description, send for Catalog 300. The Cleveland Worm & Gear Co., 3252 E. 80th St., Cleveland 4, Ohio. Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers



friendly rivalry keeps
us *Keen....*



We of the Barium corporate neighborhood compete with each other in a friendly sort of way to produce the best products and provide the best possible service to our customers, but we work together as one team whenever our skills and facilities are needed to do a complete job.

The Barium group has the most modern facilities, strategically located, to produce a wide

range of steel products, from raw material to finished fabrication. Consult Barium, addressing any subsidiary in the field of your interest.

WE MELT, ROLL, CAST, FORGE, STAMP, MACHINE
AND FABRICATE STEEL

ONE OF THE **16** BARIUM GOOD NEIGHBORS

SHEFFIELD IRON AND STEEL COMPANY

Subsidiary of Barium Steel Corporation
SHEFFIELD, ALABAMA

Producers of gray iron castings weighing up to five tons and King Ferronite Lighting Standards. Completely self-contained plant includes pattern shop, core room, and machine shop, with a capacity of 600 tons of commercial castings per month.



Barium
STEEL CORPORATION
STEELWRIGHT
TO THE NATION

BARIUM STEEL CORPORATION

EXECUTIVE OFFICES
25 BROAD ST., NEW YORK, N. Y.

AMERICAN STEEL TRACTOR CORP., Canton, Ohio • CLYDE IRON WORKS, INC., Duluth, Minn. • CENTRAL IRON AND STEEL COMPANY, Harrisburg, Pa. • BARIUM STEEL & FORGE, INC., Canton, Ohio • BARIUM EQUIPMENT CORP., BARIUM STEEL EXPORT, INC. • BAYONNE BOLT CORP., Bayonne, N. J. • THE CUYAHOGA SPRING COMPANY, Cleveland, Ohio • THE GEOMETRIC STAMPING COMPANY, Cleveland, Ohio • PERMA-JACK CORP., Cleveland, Ohio • PORCELAIN STEELS CORP., Cleveland, Ohio • THE DETROIT STEEL CASTING COMPANY, Detroit, Mich. • SHEFFIELD IRON & STEEL CO., Sheffield, Ala. • KERMATH MANUFACTURING COMPANY, Detroit, Mich. • KERMATH (CANADA) LTD., Toronto, Ontario, Canada • REPUBLIC INDUSTRIES, INC., N. Y. • GLOBE FORGE, INC., Syracuse, N.Y. • ERIE BOLT & NUT COMPANY, Erie, Pa. • WILEY MANUFACTURING COMPANY, Mountville, Pa., and Port Deposit, Md.

* Pre-Paint Recommendation

1st stage - Spray 3 minutes
Oakite Crysoat No. 87, 1 to 2
2nd stage - Overflowing clean
water, rinse 30 to 45 seconds
3rd stage - Rinse with solution
of chromic acid

**For every
metal-cleaning
job there is
an efficient
Oakite method:**

**Precleaning in tanks
Precleaning in
machines**

**Alkaline cleaning
in tanks**

**Alkaline cleaning
in machines**

Pickling

Barrel cleaning

Electrocleaning

* **Pre-paint treatment
in machines**

**Pre-paint treatment
in tanks**

Steam-gun cleaning

Paint stripping

FOR MORE INFORMATION about these and other processes—burnishing, anti-rusting, treating water in paint-spray booths, etc.—consult the Oakite Technical Service Representative in your vicinity or write direct.

OAKITE PRODUCTS, INC.
30H Thames Street, NEW YORK 6, N. Y.
Technical Service Representatives Located in
Principal Cities of United States and Canada

OAKITE
REG. U. S. PAT. OFF.

Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

Fatigue Cracks

BY C. T. POST

Crystallization

• • Under many cycles of repeated stress, especially cycles of reversed stress, a crack may start in a minute area of plastically deformed metal. This crack is due to the exhaustion of the ductility of the over-stressed metal, and the crack, once started, will spread, even under a relatively low stress, causing final fracture without appreciable elongation or shortening of the piece fractured.

Such a spreading crack is a fatigue crack, without capital letters. This clarifying definition is printed for the more or less exclusive benefit of Orville Prescott, book reviewer for the New York Times. In reviewing the book, "No Highway," whose plot revolves around faultily designed airplanes whose tails—ulp, empenages—drop off, Mr. Prescott took a deep breath and dove into the matter of fatigue.

"'Fatigue,'" he ventured, "... is a 'disease' of metals that causes them to *crystallize* (italics ours) and break in two, hardly a good thing to have happen in aircraft structures."

Mr. Prescott would probably gulp and ground himself for life if we told him that all metal aircraft structures, in fact all metals, are crystalline without going on to say that fatigue failure is not obligatory. We'd hate to have the New York Times suddenly begin a front page campaign for exclusive use of plywood planes, and start this Howard Hughes thing all over again. That would test everyone's endurance, and we can't stand any competition in this matter of fatigue cracks. But if Mr. Prescott doesn't mind our muscling in his business, we'd like to remind him that crystallize is spelled with two "i's."

Dawn for Congressman Rich

• • Last Spring, when Congress was in a tizzy over the steel price structure, U. S. Steel's Benjamin Fairless patiently played his perennial role as whipping boy for a Congressional committee. Your favorite family journal, which enjoys a wide Washington circulation for the sole purpose of providing expert testimony, was being waved before Mr. Fairless as evidence. At this point, Rep. Robert F. Rich of Pennsylvania, a woolen manufacturer whose knowledge of the steel industry was apparently very fuzzy, woke up with a start.

"I would like to ask the Senator, the article he read from IRON AGE,

who is editor of that?" he demanded.

Senator O'Mahoney flubbed the question. Representative Rich suspiciously suggested, "It might be anybody," with which the Senator turned to Mr. Fairless:

"Mr. Fairless, is not IRON AGE accepted as a competent and well-managed trade journal by those who are engaged in the steel industry?"

Mr. Fairless, so far as the record shows, didn't hesitate. "To the best of my knowledge it is so recognized throughout the industry generally," he affirmed.

That cinched the matter, and out of modesty we wouldn't mention it now, if our buttons weren't popping over a new convert to the f.f.j. religion. For, in the Congressional Record detailing the recent special session we find that an f.f.j. editorial was printed as an extension of the remarks of one of the representatives ... one Robert F. Rich of Pennsylvania.

Aptronyms

• • Reader Charles C. Finn of Seattle, with all the opportunities that city offers in the fishery business, lets us down by sticking to galvanizing. As if to apologize for this shortcoming, he sends along a lifetime's aptronymic collection.

In his youth, he recalls that a leading doctor of Berkeley, Calif., was a Dr. Payne, while adjoining Oakland boasted a Dr. Blood. With New York's Dr. Splint a worthwhile clinic could have been formed, but the opportunity was missed.

When he moved to the Seattle suburb of Georgetown, he found the villagers leading a happy existence. A local brewery paid all the taxes, provided free suds on a come-and-get-it basis, and gave each householder a free turkey at Christmas. Only death was awesome, for Sprinkle & Freese were the local undertakers.

Modern Seattle has lost these finer things of life, but Rosaia Brothers, florists, are a good bunch.

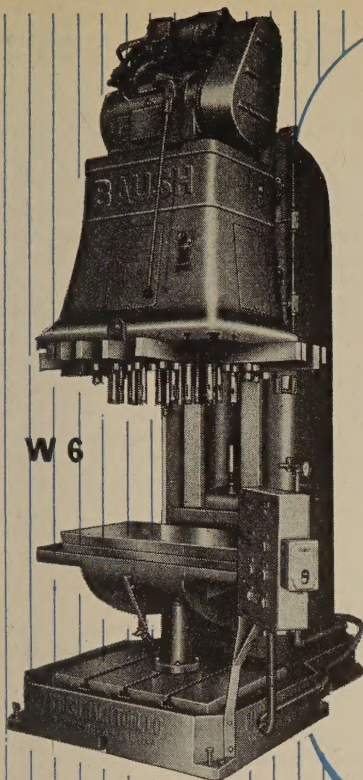
From the national news, he picks Col. Westray Battle Boyce, of the WACS, and Surendra Mone Gosh, president of the Bengal Provincial Congress, as a good military pair. As an aide, purely for rhythm, he suggests Maj. Gen. Usal G. Ent, and we accept the nomination on that basis.

And, as an aptronymic misfit, he submits Dr. Bacon F. Chow of the Squibb Institute for Medical Research, who completely overlooked the golden opportunities offered as a short order cook.

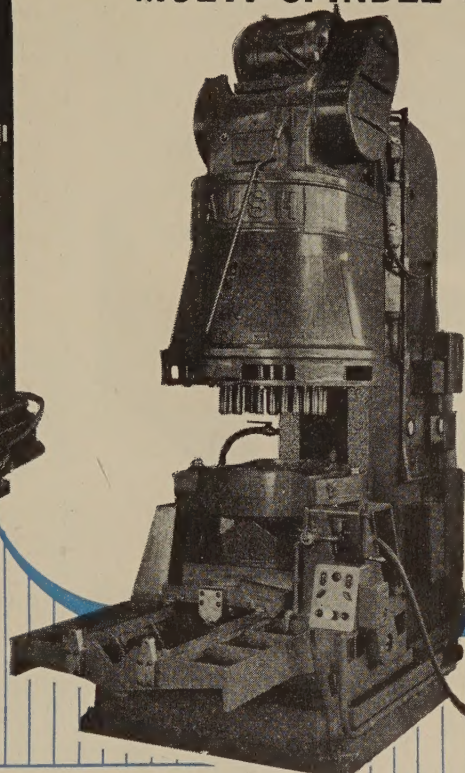
GREATER PRODUCTION

at lower costs . . .

**THAT'S A "MUST" IN BAUSH "W" TYPE
MULTI-SPINDLE MACHINE TOOLS!!**



W 6



W 7

Baush "W" Type machines are especially adaptable for both flange drilling and rectangular hole layouts. Available in 3 sizes, shown in specifications, with adjustable arms to handle drilling of hole centers that constantly vary — or with master-bored cluster plate having spindles in fixed pattern to fit one operation. Horsepower capacities are graduated to cover predominant drilling operations. • Spindle heads are of adjustable, joint driven type, with slip sleeve spindles or adjustable arms that can be furnished in various standard sizes to meet work requirements. "W" Type machines are arranged for 18" maximum stroke of heads — adjustable feed rates — 2 speed geared yokes and can be adapted for tapping. Either adjustable knee tables, box tables or rotating tables are available.

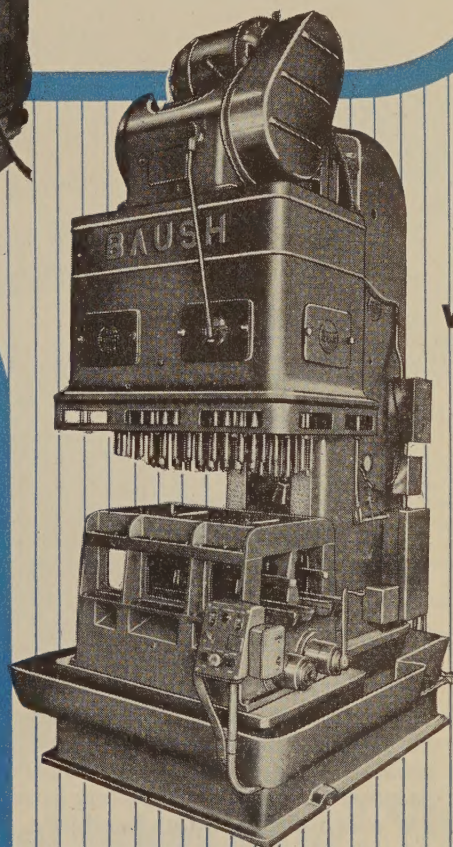
Also furnished as single way, 2-way or 3-way machines.

SPECIFICATIONS OF STANDARD W-TYPE MACHINES

	W-6	W-7	W-8
Maximum Horsepower Capacity for Spindle Drive	10 H.P.	20 H.P.	30 H.P.
Top of Base to Bottom of Head Flange, Head up	60"	54"	50"
Max. Standard Stroke of Head	18"	18"	18"
Overall Height of Machine with low base	139"	141"	150"
Approx. Net Weight of Machine (Lbs.)	15,000	20,000	27,000
Head Sizes Available— Measurements taken between Spindle centers as follows: At Side, S. At Front, F.	18"S. x 24"F. 18"S. x 36"F. 24"S. round	20"S. x 30"F. 20"S. x 45"F. 32" round 36" round	20"S. x 30"F. 20"S. x 52"F. 32" round

These exceptionally versatile multi-spindle drilling and tapping machines fit the needs of nearly all manufacturers for "greater production at lower costs."

Essentially designed and built for heavy duty and hard usage, the Baush "W" Type machines are known for their rigidity, simplicity, accuracy and ease of operation.



W 8

BAUSH

MACHINE TOOL CO.
SPRINGFIELD 7, MASSACHUSETTS

Better Performance ... because of

Better Structure*

This Kennametal Style 11H90
Tool turns five of these semi-
steel cast-iron cylinder liners
compared to one with the
carbide tool formerly used.

* Consistent soundness and uniformity of structure characterize all Kennametal compositions, as illustrated in the micrograph above (1500 times enlargement). Note absence of large grains, and virtual freedom from porosity.

All Kennametal compositions are much harder than the hardest tool steel, and the uniformity of hardness and strength of each grade comes from a consistently sound physical structure which is produced by distinctive processing, and precise, scientific methods of control.

It takes a hard, strong, sound tool material to remove 4,500 cubic inches of metal from five of these semi-steel cast-iron cylinder liners before regrinding—and then to repeat the performance after each resharpener, over the entire life of the tool.

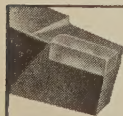
The proof of the pudding is in the eating—service results prove that a carbide which gives superior service is that having uniform grain structure, and therefore consistently maintained hardness, strength, and wear-resistance. That's Kennametal.

Equally important in cutting machining costs are Kennametal developments in mechanically-held tooling which further extend the profitable use and low-cost maintenance of carbide tooling. Kennametal tooling is completely-proved—can save money on 90% of your routine and unusual jobs. Ask our district engineer to demonstrate.

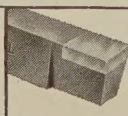


KENNAMETAL Inc.
LATROBE, PA.

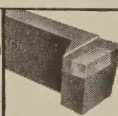
MANUFACTURERS OF SUPERIOR
CEMENTED CARBIDES AND
CUTTING TOOLS THAT
INCREASE PRODUCTION



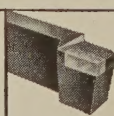
STYLE BL



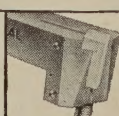
STYLE C



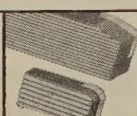
STYLE FL



STYLE GL



KENNAMATIC
STYLE 12SK



SERRATED MILLING
CUTTER BLADES

Dear Editor:

PIPE IMPORTS?

Sir:

I have been advised that a firm in New York is importing 1000 tons per month of J-55 seamless oil well casing (32-ft lengths, 5½-in. OD, 15.5 lb per ft, 8 round threads with long couplings) from the Ruhr Valley in Germany. The specifications are allegedly the same as API specifications on this product. . . . My purpose in writing you is to inquire if you could enlighten me on the exact procedure which I must follow in order to locate or contact manufacturers in Germany who produce this grade of material.

JOHN W. MOORE
John Moore Specialty Co.
Chicago

● All inquiries on the export of commodities from Bi-zone Germany must go through William J. Logan, U. S. Chairman, Joint Export-Import Agency, New York. This agency has been set up as a joint British-American group to control shipments to or from the occupied areas.—Ed.

RADIOACTIVE CARBON GAGE

Sir:

I have noted with interest your article, "Noncontact Thickness Gage Uses Radioactive Carbon," in the July 29 issue. I would like to know more about the instrument—particularly the name and address of the manufacturer in order that I may contact them.

JEROME J. FRANK
Vice President

Detroit Aluminum & Brass Corp.
Detroit

● The gage was developed in the laboratory of Goodyear Tire & Rubber Co., Akron, Ohio. Dr. L. B. Sebrell, director of research for the company, can give you further information.—Ed.

CONTINUOUS CASTING

Sir:

The writer has just read the article, "Continuous Casting of Semi-finished Steel," in the Aug. 19 issue, and wishes to go on record with the opinion that this is one of the finest technical articles appearing in the trade magazines in recent years.

The article appeals to other than those directly interested in the manufacture of steel and covers the entire procedure so that even a nontechnical reader will gain a true evaluation of the importance of this development.

EARL CANNON
Chief Engineer

American Steel Foundries,
Elmes Engineering Works
Chicago

BARBED WIRE SHIPMENTS

Sir:

Reference is made to a chart published in your July 22 issue covering shipments of steel products. It is



Now - Magnetorque Crane Control takes over

So superior is the new Magnetorque Control in every phase of operation that it has now been adopted as standard for all P&H AC Cranes.

This means that the old mechanical load brake has become obsolete. Instead, this new control transmits braking forces electromagnetically. There is no friction—no wear

—no maintenance of brake linings. It is more positive. It provides better speed-load characteristics. And it lasts the life of the crane. Before you invest in new crane equipment, be sure to get the facts about it.

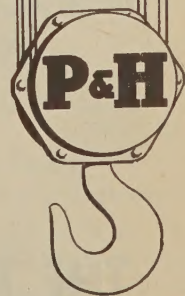
P&H

HARNISCHFEGER
CORPORATION

HOISTS - WELDING ELECTRODES - MOTORS **P&H** EXCAVATORS - ELECTRIC CRANES - ARC WELDERS

**OVERHEAD
CRANES**

4401 West National Avenue
Milwaukee 14, Wisconsin



**MAGNETORQUE
CRANE CONTROL**
IS ANOTHER P&H
ADDED VALUE

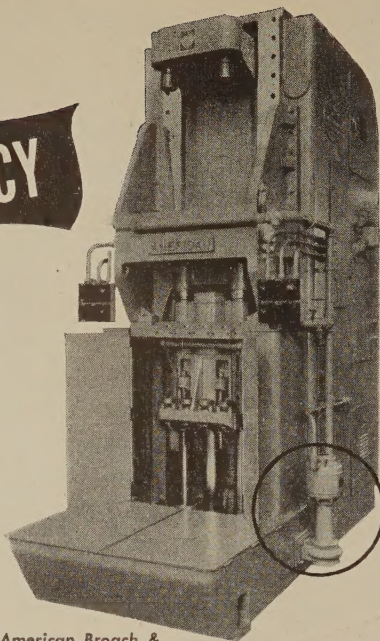
OVER 15,000 P&H CRANES SERVE AMERICAN INDUSTRY...FAR MORE THAN ANY OTHER

IMPROVED EFFICIENCY

WITH

RUTHMAN GUSHER COOLANT PUMPS

Photo courtesy American Broach & Machine Co.



For improved efficiency in your metal cutting operations specify Ruthman Gusher Coolant Pumps.

Oversized pre-lubricated bearings reduce maintenance cost. Electronically balanced rotating parts assure quiet operation and longer life. Split-second control of coolants, from a trickle to full volume, gives coolant flow where you want it when you want it.

Illustrated is an American VP-5-25-40 Broaching Machine equipped with a Model 11022-C 1/2 HP Gusher Coolant Pump.

Write now for Catalog 10-B

THE RUTHMAN MACHINERY CO.

1821 READING ROAD

CINCINNATI 2, OHIO



noted that the tonnage for 1947 for wire, barbed and twisted, amounted to 256,991 tons, as produced by 15 companies. As this office is now purchasing a large quantity of barbed wire, it is our desire to secure the tonnage, by companies, used in the survey.

COL. W. L. MEDDING
Chief, Chicago Procurement Office
Dept. of the Army, Corps of Engineers
Chicago

● The chart was compiled by the American Iron & Steel Institute, New York. A breakdown by companies was not released but annual capacities of the principal barbed wire manufacturers are listed in the "Iron & Steel Works Directory of the U. S. and Canada," published by AISI.—Ed.

STRAIN INDICATOR

Sir:

Can you supply us with the name of the manufacturer of a solution which when brushed on a metal surface will show up the strains when the metal is bent. We understand such a solution exists, however we have been unable to locate the source of supply.

J. S. NETTH
Purchasing Agent
Hardinge Brothers, Inc.
Elmira, N. Y.

● You probably mean "Stresscoat" — a product of Magnaflux Corp., Chicago. Their New York office is sending you information on the material.—Ed.

SOFT METAL HARDNESS TESTS

Sir:

Please send tear sheets of the following: "Hardness Testing of Soft Metals" from the June 24 issue and "New Temper Designations for Aluminum Alloys" from the same issue.

H. MILTON ROBINSON
Assistant in Charge of Research
A. O. Smith Electrical Mfg. Co.
Los Angeles

BALL BEARING STEELS

Sir:

In Newsfront of the June 17 issue, an item states that wear fatigue tests on ball bearings substantiate the fact that 0.5 pct Mo steels show better accelerated wear life than does the standard 52100 steel analysis. I would appreciate your advising us any further details on this.

J. F. OEHLHOFFEN
Vice President
Kaydon Engineering Corp.
Muskegon, Mich.

● A three-part article, "Metallurgical Aspects of Ball Bearing Steels," in the Sept. 2, 9 and 16 issues gives the details of a study of new alloy combinations as well as standard steel grades in bearing applications. The Newsfront item refers to these tests.—Ed.

CARBIDE MILLING CUTTERS

Sir:

We have been told that you publish a booklet entitled "How to Use Carbide Cutters for Milling." We



Lebanon and Firth-Vickers join forces

*... to bring you the best
in centri-die (centrifugal) permanent mold
alloy castings. For heat and corrosion resistant service.*

THE centri-die process of producing centrifugal castings in permanent molds is the most important improvement of a generation of alloy steel foundry progress. Developed by Firth-Vickers of Sheffield, England, before the "Battle of Britain", the unusual design characteristics and integrity of these castings made possible the famous Rolls Royce, De Havilland and other British jet engines.

Now Firth-Vickers has chosen the Lebanon Steel Foundry as its American licensee and correspondent, with full access to all their metallurgical, design and other engineering data. This makes available to American industry the newest techniques of permanent-mold centrifugal casting. By this process tubular and cylindrical structures can be made out of alloys which are difficult or impossible to forge or cast by any other method. For us and our customers it virtually wipes out years of costly experimentation. An addition to our foundry at Lebanon has just been completed and we are now producing centri-die alloy castings of known characteristics and assured integrity.

LEBANON STEEL FOUNDRY • LEBANON, P.A.

"In The Lebanon Valley"

LEBANON
ALLOY AND STEEL

Castings



HIGHLIGHTS OF LEBANON PROGRESS

- 1911**
Company organized.
- 1915**
Herault furnace installed, one of the first electric furnaces in the U.S.
- 1926**
Production of alloy steel castings began.
- 1930**
Ajax high frequency induction furnaces installed. The first used in this country for producing alloy castings.
- 1933**
Lebanon becomes exclusive American licensee of George Fischer, Ltd., Schaffhausen, Switzerland. Swiss Chamotte method first used in America in producing alloy and carbon steel castings.
- 1948**
Lebanon and Firth-Vickers Stainless Steel Ltd. sign agreement, making available to American buyers of heat and corrosion alloy castings all the experience and methods developed by the largest producer of such castings in Europe.

Get This Book "Centri-die Centrifugal Castings"

Prepared by Lebanon and Firth-Vickers engineers to explain fully the practical advantages of the centri-die process of making alloy castings centrifugally in permanent molds. While it has been written primarily for the design and metallurgical engineer, it also will be of interest to executives who like to keep abreast of new manufacturing and production methods. Write for a copy of Bulletin F.

Where is the safest position for a lifting magnet's weld—

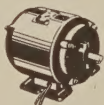


• Operating men who have seen the beating a magnet takes in service know that **TOP OF THE MAGNET** is the safest place for a weld. Only new **Ohio PROTECTO-WELD Magnets** offer you this advantage!

They're built to withstand harder knocks day in and day out for years. Outer ring and top plate are welded together **ON TOP OF THE MAGNET**. This protected weld retains its shape, is never dented in. The weld can be turned down for magnet disassembly without cutting away outer ring . . . without destroying outer pole.

For extra years of low-cost operation, invest in Ohio

PROTECTO-WELD Magnets. They operate cooler . . . lift more uniformly over extended periods of operation . . . last longer. Sizes include 39, 46, 55 and 65-inches diameter. For details, write today to Ohio—leader in magnetic materials handling.



Ohio is also a leading name in the small motor industry



THE OHIO ELECTRIC MFG. CO.

5908 MAURICE AVE. • CLEVELAND 4, OHIO

would appreciate it if you would forward a copy to us as soon as possible. If any expense is involved, please bill us.

E. M. LUTES
Sales Engineer

Stroh Process Steel Co.
Pittsburgh

• A copy of this book has been mailed you; the cost is \$1.10 per copy.—Ed.

POWDER METALLURGY

Sir:

I would like to obtain copies of the following articles from your April 8 issue: "Powder Metallurgy—Its Current Problems and Prospects," "Powder Metallurgy as Applied to Permanent Magnets" and "Powder Metallurgy; Low Cost Equipment for Volume Production."

GEORGE M. THOMAS
Powder Metallurgy Laboratory
Stevens Institute of Technology
Hoboken, N. J.

TOOL STEEL CHARTS

Sir:

I would appreciate tear sheets of the "Comparative Tool Steel Brands" charts from the July 29 issue.

L. H. DALE
American Car & Foundry Co.
Berwick, Pa.

RECORD PLAYER PRODUCTION

Sir:

We would greatly appreciate your sending us, for Prof. Karl Hill here at the Tuck School, tear sheets of the following article: "Producing the See-burg Non-Stop Record Player" from the Aug. 26 issue.

N. L. PIERCE
Librarian
Amos Tuck School of Business
Administration, Dartmouth College
Hanover, N. H.

VACUUM MELTING

Sir:

We would like very much to have a copy of the article "Industrial Vacuum Melting" published in the Feb. 19 and 26 issues.

F. M. WEITLAUF
Steel & Tube Div.
Timken Roller Bearing Co.
Canton, Ohio

HIGH TEMPERATURE CERAMICS

Sir:

Will you please send me a copy of the article "Ceramic Group Explores High Temperature Applications" which appeared in the July 8 issue.

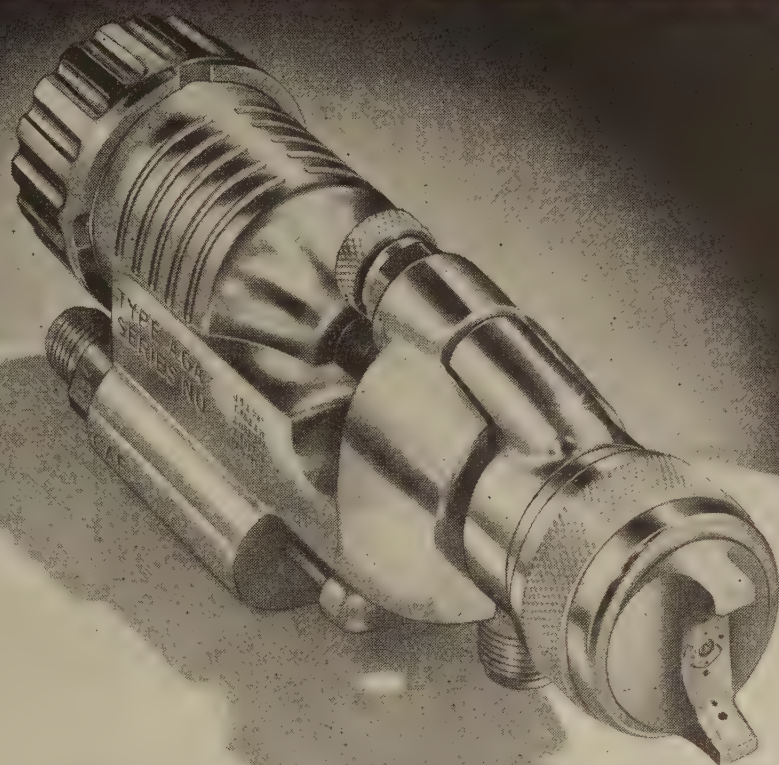
H. R. LOWERS
Navy Dept., Bureau of Aeronautics
Washington

PRICE FLUCTUATIONS

Sir:

As a supplement to your issue of Jan. 6, 1921, you published some most interesting charts showing fluctua-

SERVING YOU by doing things with air



Portrait of a NEW Production Genius

● Here's the DeVilbiss AGA . . . newest development in a long line of DeVilbiss Automatic Spray Guns and a veritable production genius. You'll find this expeditor at work in finishing departments everywhere because it has been perfected and proved in actual service to bring more speed, higher efficiency and still greater economy to all automatic finishing operations.

Automatic spray systems by DeVilbiss, with guns like this at their business end, finish products so much faster than other methods, manufacturers realize substantial savings which aid in offsetting constantly in-

creasing costs. Imagine . . . 60 electric insulators per minute . . . 3,600 golf balls per hour . . . 4,000 automobile wheels per day . . . 9,600 sq. ft. of wallboard per hour! And whatever the material used, this automatic gun which eliminates the human factor, produces work of the highest attainable quality without variation.

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tions in the prices of crude and finished iron and steel from Jan. 1, 1898 to Jan 1, 1921, and also fluctuations in carload prices of lake copper, lead, tin and spelter in New York and tinplate and No. 28 black and galvanized sheets in Pittsburgh for the same period.

We have these charts framed in our office and wonder if you have later charts covering the same subjects from 1921 up to the present time? If so, we would like to have copies.

EDWIN T. JACKMAN
Manager, Bar Steel Div.

Charles G. Stevens Co.
Chicago

● In recent years we haven't published charts which exactly complement your 1921 set. However, we have published some which include the products you mention—although not all of them show fluctuations up to 1948. In our Jan. 2, 1930 issue, there are charts showing steel ingot and pig iron price levels for the 1918-1929 period as well as copper, lead, tin, spelter, tinplate and black and galvanized sheets fluctuations from 1914-1929. In the Jan. 4, 1940, issue there is a chart showing pig iron, finished steel and scrap price changes from 1914-1939, and another which gives copper, zinc, lead and tin fluctuations from 1924-1939. In this year's issue of Jan. 1, a chart shows the scrap composite, finished steel, copper and steel ingot price levels for 1918 through 1947. Unfortunately we have copies only of the 1948 issue and have sent you the chart from it.—Ed.

METAL FINISHING

Sir:

We would like to know if it is possible to obtain a copy of your Metal Finishing Manual. . . . Please advise the cost of this manual which we would very much like to have for our use.

CHARLES WISE
Secretary

Buckeye Products Co.
Cincinnati

● Copies are \$3.00 each.—Ed.

FORGING DIE LIFE

Sir:

We would appreciate your sending us a tear sheet of the article "Increasing Forging Die Life" from the May 27 issue.

V. B. SEIDEL
International Nickel Co., Inc.
New York

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Sir:

Will you please let us know if you have the following article in reprint form, and also the cost: "Evaluating Hydrogen Embrittlement in Acid Pickling" in the June 17 issue.

M. L. STUTE
Engineering Library
Lockheed Aircraft Corp.
Burbank, Calif.

● The article was not reprinted. However, we have sent you tear sheets. There's no charge.—Ed.

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No Time for a Quarrel

A controversy is currently raging between insurance leaders and certain spokesmen for banking which is doing neither industry any good. It all started last November when the Federal Government was confronted for the first time with a serious cost-of-living issue. It was then that the President presented his ten-point program of inflation control.

The only politically safe method for combating inflation was along credit and monetary lines. This took the form initially of higher rates for the government's own short-term obligations and a rise in the rate at which commercial banks could borrow from the Federal Reserve Banks.

Unfortunately, this particular formula for price control adversely affected the government bond market since a rise in money rates tends to depress the value of all obligations with a fixed coupon rate. How far money rates could be raised to discourage credit expansion without injuring the market for the government's own securities presented a fine problem in control.

It was resolved by a technique which the government had already made familiar in the field of farm prices, i.e., the price of a group of key issues was pegged, with the Federal Reserve Banks stepping in to absorb all offerings not accepted by the open market at the pegged price. Since last November, these banks have been forced to buy more than six billion of intermediate and long-term government bonds. The question immediately raised in many minds was whether the government could continue indefinitely to support the market for its own obligations.

While this question was being debated the great life insurance companies, holding some \$21 billion of government bonds at the end of June 1947, proceeded to sell some of their holdings because they could invest the money to better advantage in a market in which the general level of rates was now rising. These net offerings by the life companies, a little less than \$2.5 billion during the following 12 months, were largely if not entirely bought by the Federal Reserve Banks. It seemed to some students professing to represent banking that the sale of these bonds by the life companies in order to take advantage of higher market rates was jeopardizing the entire bond support program. One of our contemporaries, *The American Banker*, charged that this action contributed "crazily to the inflation spiral" -- "endangers our national credit", that "Congress has no choice but to act to protect that basic element in our economy."

This charge provoked an immediate, vigorous rejoinder from Thomas I. Parkinson, president of the Equitable Life Assurance Society, in which he claimed that "Federal Reserve support of government bond prices inflates our money supply - now \$170 billions compared with \$150 billions on Jan. 1, 1946.

This is an ill-advised dispute between two great industries, neither of which shares any primary or substantial responsibility for the present high cost of living. Bankers, smarting under the restrictions which the special session of Congress imposed on them, would do better than seek other equally innocent victims of political expedience. This pot-and-kettle charge and countercharge adds little light to the subject and will result surely in fastening more onerous restraints not alone on the insurance companies but also on banks.

Joseph Stagg Lawrence



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RYERSON STEEL

SEPTEMBER 21, 1948

► Rio sources say that Carnegie-Illinois Steel Corp. is receiving high grade iron ore from Brazil. About 150,000 tons will have been shipped from there by the end of December.

► Broad top level cooperation with the United Steel Workers of America is best with U. S. Steel's Ben Fairless. But when it comes to administration of the contract and ironing out things down the line, Bethlehem's Joe Larkin and Republic's Tom Patton have made a name for themselves for quick elimination of gobbledegook.

► Personnel changes in the automotive industry are coming thick and fast these days. The recent reshuffle in GM's top executive staff is probably the most far reaching in many years. Ford is reported to be transferring hundreds of nonproduction workers to production jobs.

► Skin milling, one of the most important new machining developments in recent years, is being used by at least 2 aircraft manufacturers in the production of air foils for high speed aircraft. There is a question whether this technique or forging will be ultimately used for high production, but at present there is no forging equipment with capacity large enough to handle such work.

Another method that may eventually come into its own is the Kellering method. But unless multiple cutting heads can be designed for this type of machine and the machine speeded considerably -- it appears this method would be too slow.

► Coking coal is now in better supply and quality than at any time in the past 8 years. In fact supply is such that prices are softening. Although the steel industry's coke headache has eased, its scrap migraine continues. Nothing in sight indicates when it may end.

► The CIO recently received and paid their bill for legal services connected with the Supreme Court test case of the Taft-Hartley Bill. It was about \$84,000. The CIO was represented by Lee Pressman, former CIO counsel who has had labor's interests at heart for some time, and Charles J. Margiotti of Pittsburgh who has been prominent in labor circles for years.

► There's a lot of speculation about titanium metal production and its possible applications. But nobody, other than the organizations engaged in the developmental work, will know for some time what's going on. DuPont is now making the metal in sponge form on a pilot plant basis and is distributing it to various research organizations free of charge. What the scope of the metal really is as to properties and applications will be known only after data from all the investigating sources are coordinated and given release sanction by the government which is actively interested in titanium for military uses.

► A notable trend in the auto industry is the growing popularity of the convertible and the station wagon. Since 1940 convertible production has increased from 2.8 pct of all body types to 4.9 pct. Meanwhile, station wagon production has jumped from 0.7 pct to 2.3 pct. Most of these gains have been at the expense of 2-door sedans, coaches and coupes -- except business coupes.

► The machine tool market is in the doldrums with no major tooling programs on the active list at present. Armament programs, while quite active in a few plants, are still in the talking stage for the vast majority of those plants that will eventually participate.

► Over \$45 million has been approved for the expansion and modernization of the Scottish steel industry. An additional \$1.6 million has been approved for the development of their iron foundries. Firms affected include Beardmores, Stewarts and Lloyds & Colvilles.

► Labor shortages are plaguing Chicago steel producers. Republic Steel reports they are losing 12,000 to 15,000 tons of steel a month because of a general help shortage. Carnegie is also feeling the pinch and are campaigning to obtain more help. Other steelmakers in this area are not in too bad shape.

► Metal bonding in aircraft application instead of the conventional riveted or spotwelded type of construction is being intensely investigated in this country. English aircraft makers are using a bonding method on a considerable number of planes both military and civilian. American investigators believe that the bonding of the outside skin to ribs and stringers offers attractive possibilities but that the metal bonding method will have to be restricted to planes whose top speed is 500 mph.

Effective Use of Fasteners

in Product Design

No product is any better than the method by which it is held together, and too frequently fasteners are relegated to a subordinate position in design. Interchangeability of bolts, plastic applications, limited space applications, inaccessible applications, and ornamental uses of fasteners, as well as a number of cases of the right and wrong of fastener application are discussed in this article.

By LOUIS J. LOVISEK

Chief Engineer,

Parker Kalon Corp., New York

ELIMINATION of delays and errors in design and fabrication is necessary for volume and quality production. Attention must be given to designing a product so that special process equipment requirements will be kept to a minimum. However, there is often too little thought given to the fasteners needed to hold together the component parts of the product. While there is a vast difference between the use of special machinery and the use of special fasteners, each is important and each should be treated accordingly. Fasteners may be a small problem to the designer, but may well become a major problem to both the designer and the manufacturer of the fasteners when manufacture of the product commences.

The demand for special fasteners resulting from insufficient foresight is aggravating. When it is discovered that standard fasteners will not fit the application, the natural reaction is to design a special fastener to fit the conditions on the assumption that this expedient is cheaper than altering the product. This course imposes unusually close dimensional requirements and puts drastic limitations on the price of the part. Delivery of the fasteners themselves is urgent, and adequate means of identifying the fasteners is not provided. With all the risks involved in mass production, a little added thinking and expense would clear up the question of fasteners.

Large manufacturers usually obtain fasteners from several sources to obtain the volume needed and to insure a supply in case of delivery stoppage from any one source. Because one source of supply can economically and quickly make a special fastener does not mean that all sources can or are willing to do the same. Each supplier has his own idea on the fabrication of an article and each has the equipment to carry out his ideas. This equipment is not identical in all cases and each type has its limitations.

Unfortunately, many designers submit projects without investigating the practicability of manufacturing special fasteners. The design is accepted and production is started. Then the designer finds that special fasteners will cost much more than similar standard fasteners. The ad-

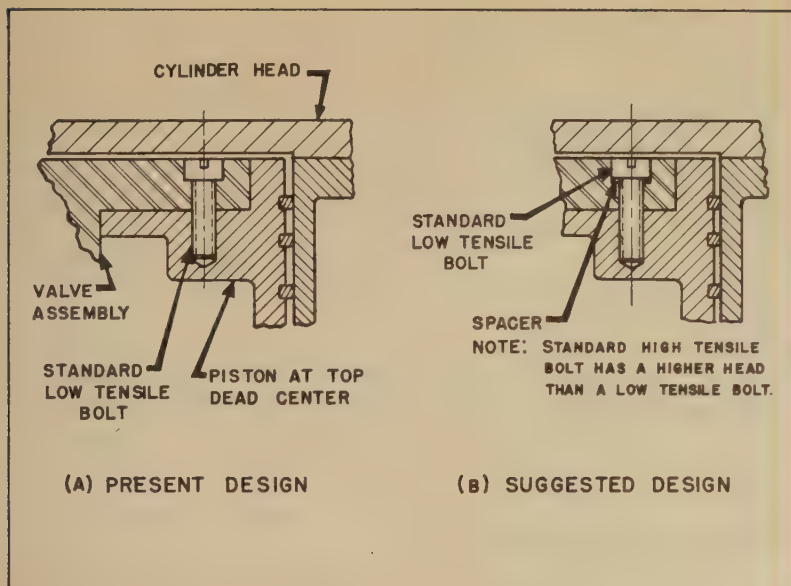


FIG. 1 - Using a standard screw, A, in a reciprocating pump to hold a valve in the piston head, breakage caused considerable trouble. Higher fatigue strength bolts could not be substituted because they were made to a different standard, and the alternate was to remachine the valve assembly, prohibitive because of cost. If the original design had been to take either soft or hard bolts, as in B, no difficulty would have been encountered.

ditional cost may completely offset the anticipated savings, while the delay in delivery of the fasteners may stop all production at the assembly point.

Recently, a manufacturer was using large washers with screws to fasten two parts together. The washer was redesigned as an integral part of the screw to save assembly time. Unfortunately, the manufacture of such a fastener required the material to flow far beyond its elastic limit. Using a material that could withstand the extreme stretching does not always solve the problem. Because of the extra material needed, more volume was required than could be handled by the producing machinery. The screws could be made on other equipment, but the extra cost was in excess of the anticipated savings.

Salvaging of fabricated parts often requires special fasteners. Parts made with holes oversize can be salvaged with special bolts and nuts. Parts with holes tapped oversize require bolts with oversized threads. Often the plastic material used in molded parts does not meet specifications, but the parts can be saved by using a

screw with a special thread form. Unexpected developments, such as paint clogged threads in a tapped hole, can lead to the use of special screws as an economical salvage program.

Special fasteners that must combine utility with appearance are usually the most difficult to manufacture. Generally, one part of the fastener must be so shaped that it blends or matches the contour of the fastened component. This shape must be free from scratches, ridges, or tool marks and often must be polished. Such requirements mean special tools, methods, handling and inspection by the fastener manufacturer.

Most of the need for special fasteners can be avoided by proper consideration of the use of standard parts. Appearance and utility are assured by the manufacturer. The designer should allow for changes in the initial production run if the loads on fasteners are not calculable.

This latter was recently stressed in the design of a reciprocating pump. When several of these new pumps were put into service, breakdowns occurred. A series of standard bolts holding a valve in the piston head broke. The bolt heads

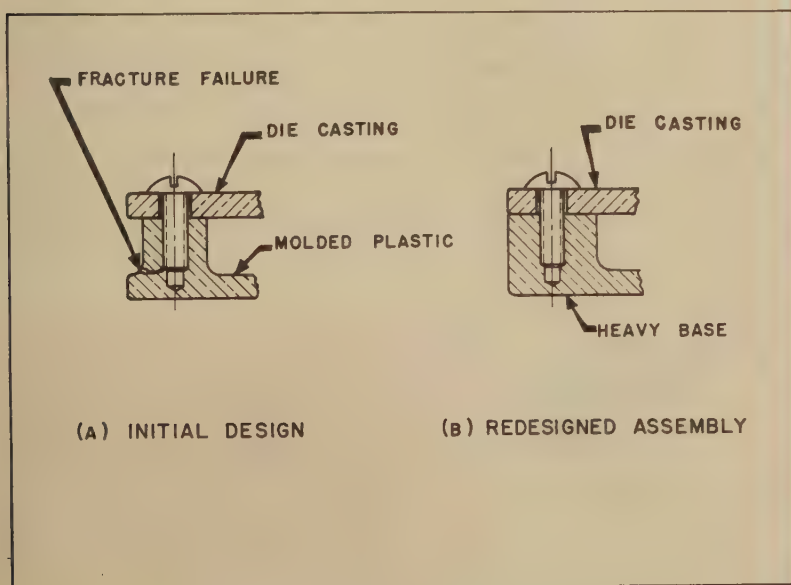


FIG. 2 - The radial pressure of the screw application, shown in A, caused the corner boss of the plastic part to break out. The part had to be redesigned so that there was a substantial wall of plastic around the screw hole, as in B. Added cost included loss of production, as well as the cost of remaking the plastic mold.

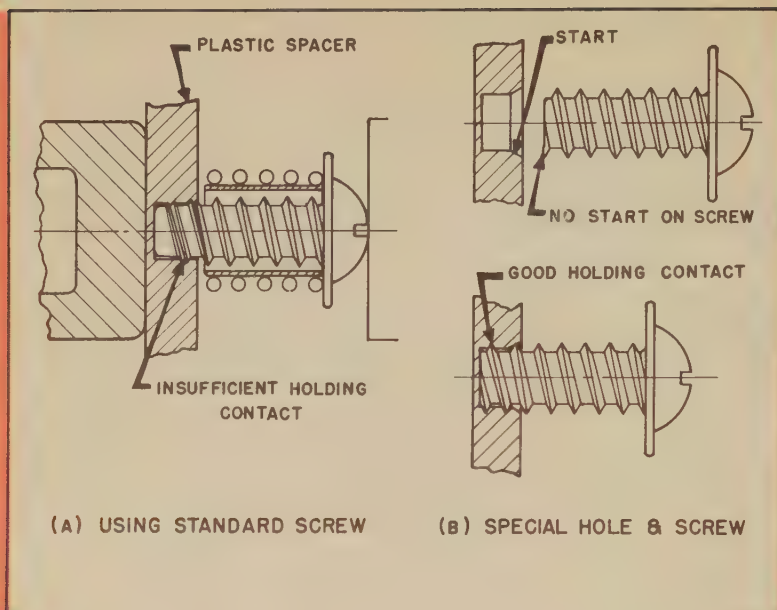


FIG. 3 - Because of limited space, the plastic spacer in A, could not be thickened and would not hold the self-tapping screw. The hole in the spacer had to be redesigned to provide the start while the screw had to be designed to eliminate the start and provide only holding strength, B.

jumped out of the counterbored holes and rested on top of the piston. The upward travel of the piston smashed the heads between the piston and the cylinder head, and unbalanced piston-face loads resulted, causing cylinder scoring. This assembly is shown in fig. 1A.

Since the demand on the pump is intermittent, the piston often operates without compression work. This action causes a tension impact load on the bolts every time the piston reaches top dead center. Repeated loading proved too much for the bolts and they failed. To correct this condition, the designer purchased bolts made of a higher fatigue strength material. He soon discovered that these bolts were made to a different standard than the soft, low-carbon bolts originally used. The designer had to order special hardened bolts and took more than the original bolts and took more time to obtain.

The alternate solution to the problem was to remachine the valve assembly. The alternate was abandoned because of the cost. There would have been no problem if the initial production run had been designed to take either the soft or hardened bolts, as shown in fig. 1B. Future production could be arranged to utilize the desired bolt, and, while this would slightly increase the initial cost, expensive servicing would be avoided.

Fastening parts to molded plastic forms is probably the most difficult task facing the designer. The most economical fastener is the self-tapping screw. This screw, however, exerts con-

siderable radial pressure in the plastic. This must be kept in mind in designing a product, yet the minimum volume of plastic material must be used. The savings of an ounce of powder per part becomes sizable when thousands of pieces per day are being made. A slight change in the powder mixture can upset all plans when the volume is calculated too close to the minimum.

A safety device was designed, requiring the fastening of a diecasting to a plastic form. The cast part had clearance holes but the plastic part had the fastener holes molded into it. Everything was satisfactory until the plastic ingredients were reportioned to meet the minimum requirements. The radial pressure of the screws caused the corner boss to break out, as shown in fig. 2A. Thousands of parts were already made that could not be rejected. The screw manufacturer was requested to design a special screw to make the assembly without breaking the plastic. In the meantime assembly had stopped and the plastic part was redesigned with a substantial wall around the holes, as shown in fig. 2B. There was ample room to provide the heavier wall. In this effort to save on materials, the designer lost production, increased the cost on the initial production run, and had to pay for remaking the plastic mold.

Redesigning a unit just put into production usually results in trouble. Such changes are made because of inadequacies found in the unit, assembly difficulties, or last minute changes in policy. The designer works under pressure and the

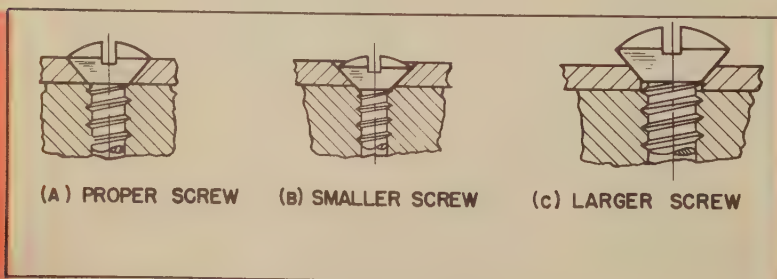
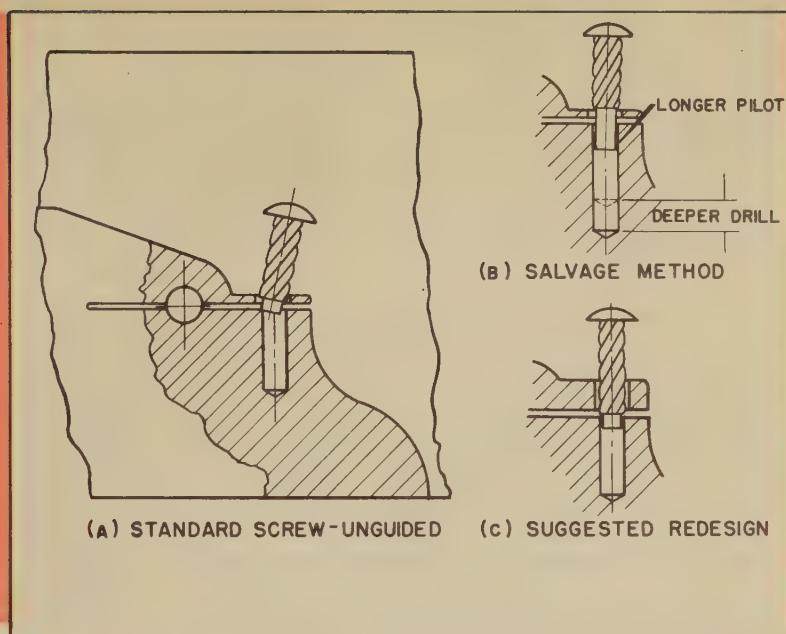


FIG. 5 - Because the screw selected for ornamental application in A, was not a standard size, while the next size smaller sunk into the part, B, and the next size larger, C, sat too high, delay in production occurred before the proper screw size could be obtained.

FIG. 4 - Because of limited space around the point of application, it was difficult on assembly to hold or guide the screw, A, into position. This was corrected for salvage as shown in B, by lengthening the pilot on the screw. On further production, standard screws were able to be used by thickening the part and increasing the length of clearance hole, as shown in C.



fastener is the part to suffer. A meter manufacturer recently decided that his latest meter didn't have sufficient flexibility. The plastic spacer in the instrument had to be redesigned to incorporate means of holding an additional wire coil.

Unfortunately the thickness of the spacer could not be increased to provide substantial material for the proper operation of the tapping screw, as shown in fig. 3A. A self-tapping screw provides its own start. The hole in the spacer had to be designed to provide the start while the screw had to be designed to eliminate the start and to provide only the holding strength, as shown in fig. 3B. Before the problem was solved, considerable experimentation had to be conducted on both parts. This resulted in a unit more costly than one utilizing standard holes and screws.

While designers are taught to design parts that can be made, even if special tools, fixtures machinery are required, ease of assembly and repair is a point often overlooked. The degree of ease of assembly may mean profit or loss on a highly competitive product. An illustration of this was the problem encountered in a unit designed to require a single metallic drive screw to hold two parts together. On assembly, it was found that it was difficult to hold or guide the screw into position because of the limited space around the point of application, as shown in fig. 4A. It is never economical to balance a screw on a production basis.

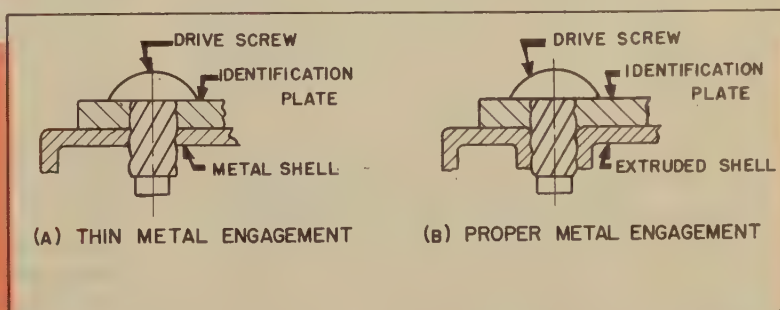
The assembly line became a production bottleneck. To salvage the parts, special self-aligning

drive screws had to be made while all the holes in the unit had to be redrilled, as shown in fig. 4B. By simply increasing the length of the clearance hole, a standard screw could have been used, as shown in fig. 4C.

An appearance problem can easily become of major proportions to the designer, resulting in a series of delays and added costs. A decorative plate was designed to be fastened to a unit using No. 9 oval countersunk screws, as shown in fig. 5A. By the time the parts were ready for assembly, it was discovered that the No. 9 screw was not a standard stock size. The head of a No. 8 screw, which is a stock size, would sink too low in the countersink, as shown in fig. 5B, while the head of the No. 10 screw would set too high, fig. 5C. Neither standard screw blended with the decorative plate. Consequently, a costly delay was encountered before the proper screws could be obtained.

Some designers feel that the presence of metal assures a means of good fastening. An extruded aluminum shell was designed to have an identification plate fastened to it by metallic drive screws. Clearance holes were made in the plate while the proper diameter holes were punched into the shell to provide thread engagement. The normal handling during shipping of the assembled parts caused the plates to shake loose because of insufficient holding material, as shown in fig. 6A. Had the holes in the shell been extruded, enough material would have been provided, as shown in fig. 6B. The more expensive

FIG. 6 - Insufficient metal in the shell, A, caused breakage and shaking loose of the top plates in normal handling during shipping. Had the holes in the shell been extruded, as in B, sufficient material would have been provided. Riveting had to be resorted to until the tools were redesigned.



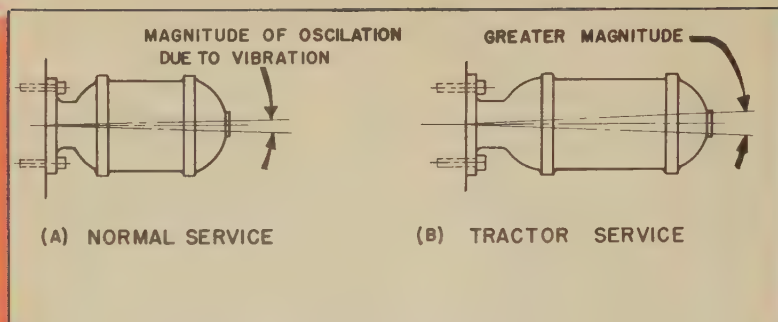


FIG. 7 - In increasing the length of the generator housing, A, in an engine, greater magnitude of oscillation caused the bolts to fail. Bolts made of special material and with a fatigue body, B, overcame the problem.

fastening by riveting had to be resorted to while the tools were redesigned.

The designer must often look beyond the unit he is designing to avoid costly experiences. Such investigation would have saved a manufacturer of gasoline engines considerable expense. In his engine, as in all conventional mobile power plants, the end shield of the generator served as the generator mounting bracket. Under normal operating conditions, the outboard end of the generator developed very little oscillation, as illustrated in fig. 7A. Since the engine was powerful and rugged, it was decided to market it, with some changes, as a tractor engine. One change was to double the size of the generator to provide sufficient current for night illuminated operations. There was ample end room but little side room, so the generator was made longer to contain the necessary windings. To maintain the interchangeability feature, the size and spacing of the mounting holes were not changed. The extra weight of the generator and the increased vibration caused by the tractor caused excessive oscillation of the unsupported end of the generator, as shown in fig. 7B. Tension fatigue caused the bolts to fail. Bolts made of special material and with a fatigue body had to be made to overcome the problem. Delay, customer pressure, and greater costs were the results of the oversight.

Each particular type of fastener is designed and built to give a definite type of service. A hardened set screw is made hard to be able to bite into a shaft or a plate. Brittleness is no disadvantage because most of its length is supported in a tapped hole. A hardened cap screw is made tough and ductile. It cannot be brittle because of the tension stress generated between the head and the body. It must be ductile to allow for slight misalignments that are apt to occur when fastening two parts together. One designer needed cap screws to hold two spaced parts together, but did not want the head. By using set screws with nuts on them, his problem was solved. The set screws, however, kept breaking until he notified the screw manufacturer who changed the heat treatment to that given cap screws. If he had originally ordered the screws stating their intended use, considerable trouble would have been obviated.

Engineers of fastener manufacturers are often invited to examine new designs for fastener problems. This service is available to designers for the asking. Some designers are reluctant to take advantage of it for fear of becoming the center of attack of competing fastener engineers. While each wants to recommend his own type of fasteners, good engineers will recommend without bias

the type that they feel will best serve the customer and the application, even if it is made by a competitor.

On a service call, an alert engineer noted that an ornamental paper weight was held to its base by two screws, as shown in fig. 8A. He suggested that an extension be molded on the weight to take the place of one screw and one hole be changed slightly to take a number of competitive screws. This arrangement is shown in fig. 8B. This suggestion reduced the cost of manufacture and decreased the risk of assembly stoppage because of extended screw deliveries.

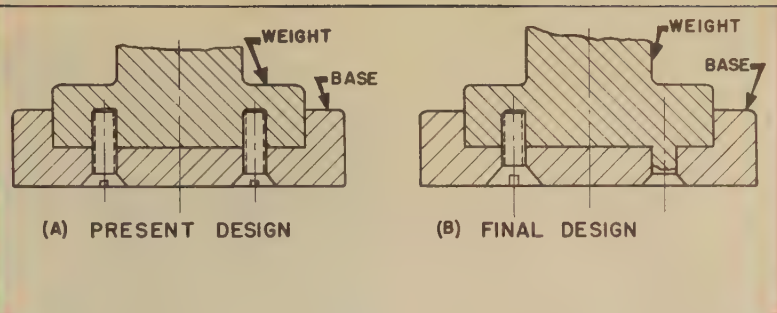
The fastener engineer must know all varieties of fasteners of his competitors, in addition to his own. He wouldn't recommend his fastener if a competitor's could do the job more efficiently. Without a mutual respect of the engineer and the designer for each other's knowledge and ability, criticism and misunderstanding result. The accepted belief is that fasteners such as nuts, bolts and screws are made on screw machines. Some designers temper this belief, but will insist that the screw machine plays a major part in their manufacture. Actually, some manufacturers turn out millions of pieces a day, and have only a few screw machines in their plants.

The fastener industry is a high-speed production industry, involving both cold forging and machining. Since machining is more costly, it is avoided to the extent that about 40 pct of the bolts and screws made today have never been touched by a cutting tool. Nuts, on the other hand, must have threads cut in by taps. In most cases this operation is the only cutting operation in the working of nuts. A research program in a large fastener manufacturing plant has resulted in an experimental method of putting threads into a nut without removing metal. The only step remaining is to develop a production machine to perform this operation efficiently.

Factors limiting the speed of cold-forging machines and metal removing machines are different. All metal cutting machinery production is governed by the surface speed and the cutting feed of the material. Improvements in cutting tools have increased the output of this equipment. Production by cold forging is governed by the design of the machine itself. The maximum rate of moving the material being forged has not been reached. Advances in machine design will built faster cold-forging machinery.

Later types of production machinery require operators of higher skill and more time to set up. The cost of operating this machinery is therefore higher than that designed 30 years ago. Increased production from the latest equipment off-

FIG. 8 - On an ornamental part, by changing the design of the product one screw was eliminated. Also, by changing one hole slightly, screws from a number of suppliers could be used. A, shows the original design and B, shows the modification.



sets some of these costs. Long production runs of stock sizes, which require few machine adjustments and result in a minimum number of non-operating hours, account for some savings in cost.

To keep large batteries of high production equipment in operation, a plentiful supply of tools must be available. The tools are made on a production basis, with each person in the production line arrangement of tool manufacture performing only one operation.

Material used in making fasteners is purchased in large quantities. Each different size, type and shape of fastener requires its own raw material in characteristic sizes. The volume of demand for a particular fastener determines the amount of material needed. With steel mills working to capacity, users are controlled as to supply. Material allotments are made for a three-month period and the steel user must estimate sizes and material requirements for this period about two months before the start of the period. Most fastener manufacturers have geared production schedules to these quotas. Larger quotas would mean more production.

Inspection methods used in mass production of fasteners differ from those generally used in heavy industries and in the job shop type of plant. In the job shop, the method is usually to pass all work through a central inspection point for a percentage inspection varying from 2 to 100 pct. In heavy industries, the inspector goes to the work to make the inspection.

Fastener manufacturers use a combination of these methods. The vast number of pieces produced and the need for fast straight line operation makes it impractical to pass work through central inspection stations. In the interest of economy such an arrangement has been replaced by roving inspectors and small departmental inspection stations. Inspectors make routine visits to the machinery, the visits being predetermined by a study of the consistency of the time period during which the machine will produce a quality product. Occasionally a machine does not follow this time cycle because of a poor piece of raw machinery, a machine jam, or a poor tool. The resultant products are sent to the departmental inspection station for a complete inspection.

With such being the method of operation in a fastener manufacturing plant, the effects of the injection of a completely special product into the system is obvious. Since the raw material needed may be of special size and shape, it must be ordered from the mill. This alone now sets the maximum time of material delivery at five months. As the quota of material is constant, special requirements necessarily take material

away from standard products. Many companies have tried to offset this by installing equipment capable of reforming standard material. This means extra investment, extra costs, and higher prices. However, such procedures permit the customer to obtain his special fasteners quickly and the manufacturer will gain good will.

Special tools are necessary to convert this material in the first operation machinery. These tools could be made by the production tool line, but the line would be slowed down since special fixtures, jigs and setups are required. Most manufacturers do not attempt to disturb the tool line, but install a special tool-working department. This department cannot meet the efficiency or the low costs of the main tool line, and expensive tool charges result.

Inspectors share a part of the burden when a special job is run on production machinery. They find it hard to fit the estimated time element into their routine. If the estimate is wrong, the routine is completely upset. To avoid this trouble, all specials are routed to the departmental inspection station, which adds to their cost.

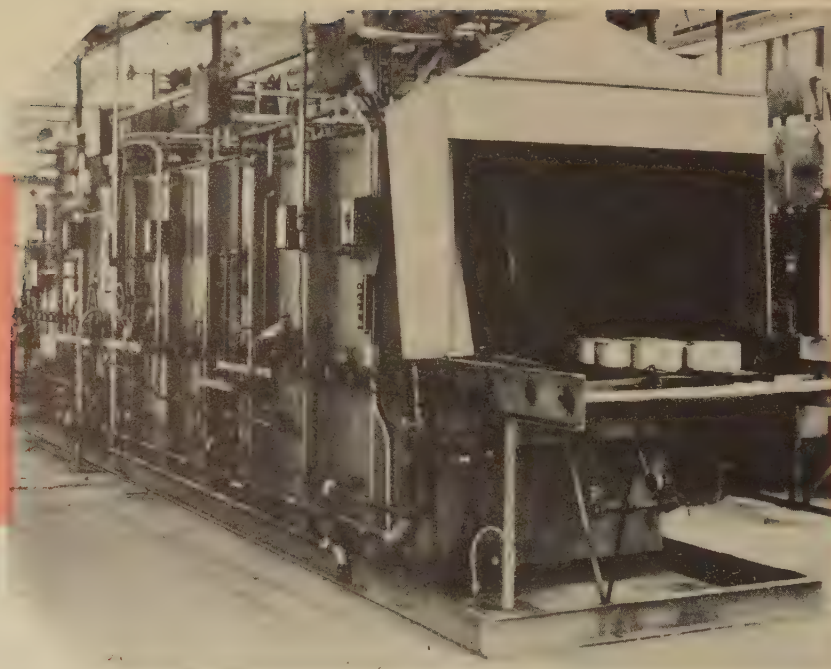
The injection of a special fastener often distracts the machine operator so that his production is noticeably reduced. To overcome this, specials are routed to a battery of machines where the operator, a man of high mental caliber, is accustomed to these different requirements. Specials generally do not run as efficiently as standard items, thus increasing their cost.

Multiplying the problems of the one operation by the number of operations required to make the fastener shows the reasons for their seemingly high cost when compared with the cost of standard fasteners. All specials do not fall into this category. Some may not need special materials, while others might require special tools on only one operation. Specials that have only slight dimensional deviations from standard can present complications. The natural tendency is for the operator to recognize sizes by sight and he will not refer to the work ticket to check his judgment. This results in mixed work and time-consuming separating operations. A better understanding between the designer and the fastener manufacturer can result in a reduction of problems to each and a gain for the consumer.

When a designer assumes the responsibility for ordering a certain fastener, the order is processed through the factory and the fasteners are delivered. If the designer elects to ask a manufacturer to review the fastener applications, an entirely different procedure is set into

(Continued on page 88)

FIG. 1 - View of the GE atmosphere controlled roller hearth continuous furnace. A, is the entrance end, while B, is the discharge end.



Continuous Furnace Simplifies

IMPORTANT operating economies, as well as improved product quality, have resulted from the installation at Landers, Frary & Clark of an electric roller hearth continuous furnace with atmosphere control for the annealing of 18-8 stainless steel. This electric furnace, manufactured by General Electric Co., replaced an oil-fired batch type furnace.

Since installation of the electric furnace rejections due to improper annealing have been less than 1 pct, a rate considerably lower than that experienced with the batch type furnace. Reworking of material, as a salvage attempt, has been practically eliminated.

The behavior of type 302 stainless in a deep drawing or spinning operation is radically different from the behavior of the more widely used materials such as low carbon deep drawing steel.

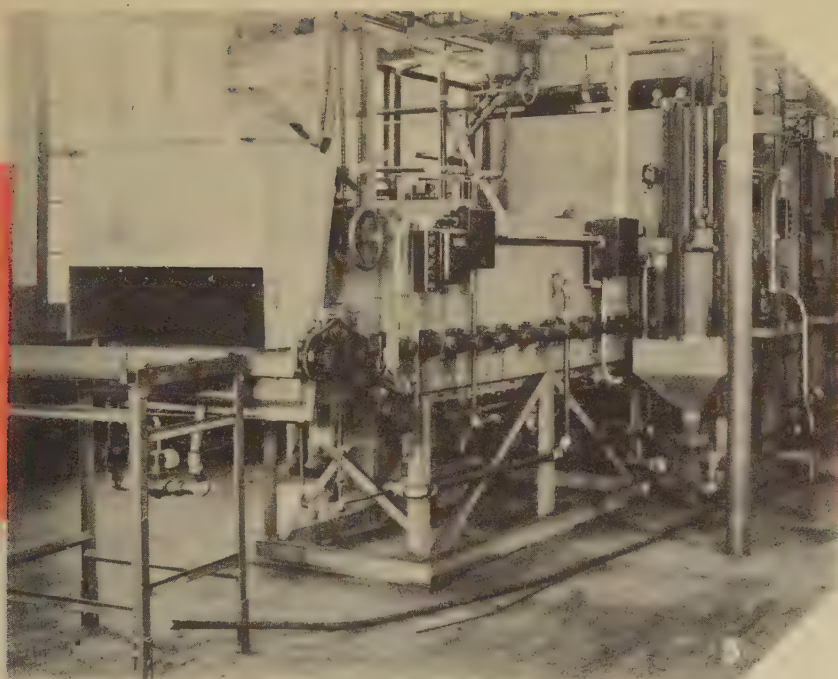
In handling 302 stainless, the processing following a forming operation is of equal, if not greater, importance than the drawing operation. It is the experience at this plant that a stainless steel container is usually irreparably ruined by an improper anneal or by conditions leading to

an improper anneal. Salvage operations are rarely fully satisfactory.

Thus, an annealing treatment to eliminate stresses set up in a previous drawing operation, and the conditioning of the material for further reduction, is of the utmost importance.

Regardless of the gage material that is to be annealed, the annealing operation should result in a uniformly annealed shell, a uniformity not only within an individual shell, but also a uniformity in all shells annealed. The importance of this is apparent upon a subsequent reworking operation where all shells should react similarly to a fixed calculated reduction. Obtaining a uniformity such as this in annealing stainless in the oil-fired batch type furnace was questionable, this doubt being reflected in the percentage of mechanical failures that were experienced.

The oil-fired batch type furnace previously used in annealing of stainless steel parts at Landers, Frary & Clark had a hearth approximately 3x6 ft, or a floor area of 18 sq ft. The furnace had a rated capacity of approximately 180 shells per hr, each shell being 6 in. diam and 9 in. high,



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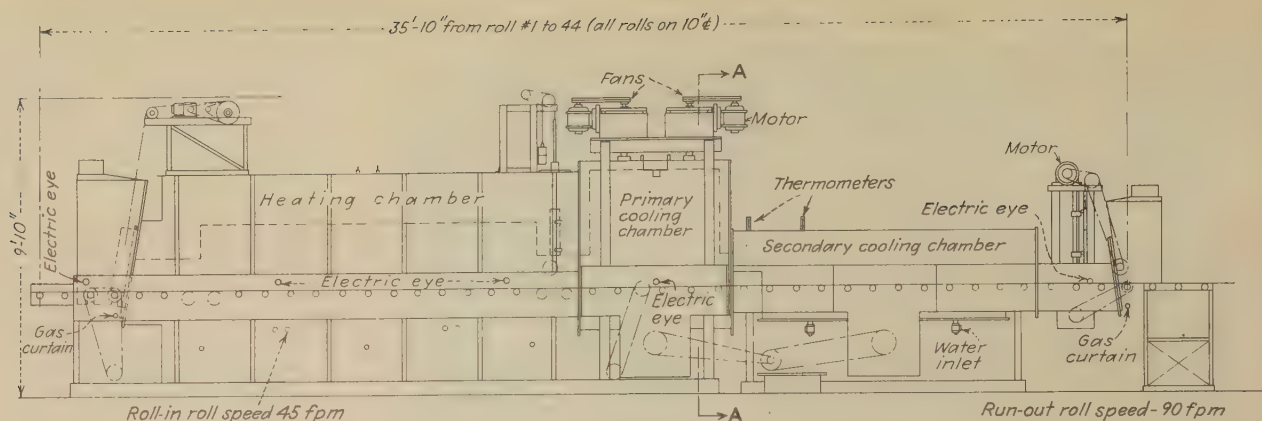
Annealing Austenitic Stainless

Advantages resulting from the installation of an electric continuous furnace with controlled atmosphere, as a replacement for an oil-fired batch type furnace, for annealing austenitic stainless steel parts are discussed in this article. Construction and operation of the continuous furnace is described and data are given comparing production rates, pickling and annealing costs, and reject rates of parts annealed in the two types of furnaces.

this size shell being one of the more common sizes annealed in this unit. This capacity rating is based on a working area of 12½ sq ft; an individual load of 60 shells and, a cycle of 20 min, including time for both loading and unloading. The ratio of oil to air was adjusted manually every morning to produce a reducing atmosphere, this adjustment varying during the working day in accordance with the judgment of the

operator. The chief objection to this practice was the variation in scale condition obtained on the annealed shells. This factor had an important influence on pickling time required to remove this scale condition. The time needed for the pickling operation ranged from 20 to as high as 45 min, after which the shells were rinsed and thoroughly scrubbed. It was especially annoying when a scale condition was particularly adherent and a re-pickling was required. There was always the danger in an incomplete removal of the scale formation, especially in crevices, of scoring the dies. As a result of the lengthy pickling cycle which was frequently necessary, the surface appearance of the pickled shells was far from satisfactory, and in some instances failure was experienced upon reworking due to a localized attack upon the metal by the pickling agent, reducing the wall thickness of the container to below safety standards.

Another difficulty, although not quite as severe as the scale problem, was an occasional lack of uniformity in the shells annealed. This condition was particularly troublesome in the morning



when there was an incomplete adjustment of heat throughout the entire area of the furnace. Upon reworking, reduction of under-annealed shells may lead to a tendency toward stress cracking, while the over-annealed shells may produce a slight roughening of the surface due to grain growth, this condition proving expensive when considering the additional time required in polishing and buffing when such finishing is required.

A thorough survey of the annealing operation was made and after taking into consideration the factors just cited, as well as the fact that demand for spun and drawn stainless containers had increased, it was decided to install the electric continuous roller hearth furnace shown in fig. 1 and 2. It was reasoned that in this type of furnace the time and temperature at which annealing took place could be accurately controlled. It would also make possible the production of a uniform scale condition so that the pickling time could not only be reduced, but could also be held more uniform than that experienced in the past.

The first consideration was the use of a dissociated ammonia atmosphere. However, due to the shape and size of a majority of the shells to be annealed, this type of atmosphere would involve high operating expense. The final choice was a cracked gas generated from the regular city supply which would give a scale being sooty in appearance, but very readily removed in 12 to 15 min.

The continuous furnace (fig. 1) is provided with automatic charging and discharging of trays and has heating and cooling chambers separated by automatically operated lift doors. The cooling chamber, the first section of which is 5 ft long, is equipped with fans to accelerate the cool under the controlled atmosphere from the operating temperature of 1875°F to approximately 800°F. The second section of the cooling chamber, which is 10 ft long, allows the work to continue a normal cooling cycle so that the material can be manually handled at the discharge end. A channel type tray, 24 in. wide and 30 in. long, was selected for the larger pieces to be annealed. A mesh grid along with a supporting mechanism was added to the channel type tray for handling smaller items. The furnace is equipped with flame screens to minimize con-

tamination of the atmosphere.

A typical operational sequence for this furnace is as follows: The furnace is usually throttled when not in use, the temperature depending upon the length of stand-down time. If the stand-down period is of three or more days' duration, the throttle temperature may be 1450° or 1500°F. In the event the stand-down period is only a matter of a few hours, the throttle temperature may be as high as 1650°F. For immediate operation on any specific morning, the furnace is allowed to rise to the required temperature, usually 1850° to 1900°F in a two to three hour period prior to the start of the working day. In this manner the furnace is not only up to the required temperature, but it is also uniformly heated by 8:00 a.m.

The operator loads the tray and places the work in the furnace. He immediately loads another tray and places this in the front end of the unit. As soon as there is room for another tray within the furnace, the door opens automatically, the rolls speed up, the loaded tray is run into the heating chamber and the door closes. The tray progresses through the heating chamber at a uniform rate of speed. As it approaches the door between the heating and cooling chamber, this door automatically opens which, accompanied by an acceleration of the rolls, transfers the loaded tray to the quick cool, after which the door closes. It is in this first section of the cooling chamber that the temperature of the work is rapidly reduced from the annealing heat to around 800°F. Fans recirculate the controlled atmosphere over the work, the cooling power being further accentuated by water circulating around the cooling chamber. The work is then passed into the second section of the cooling chamber where the parts are allowed to cool slowly to a temperature sufficiently low to permit the operator to handle the parts at the discharge end without discomfort. As the tray approaches the exit end of the cooling chamber, the door at that end automatically opens, the rolls speed up and the door closes as soon as the tray is discharged. The fast cooling rate used in the first cooling chamber was established after experimental work on a similar type furnace, prior to the purchase of the one now in the plant, proved that the cool was sufficiently rapid for the gage of stainless used in this plant

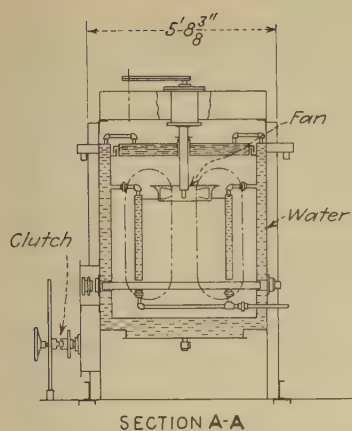


FIG. 2 - Sketch of the electrically heated continuous annealing furnace.

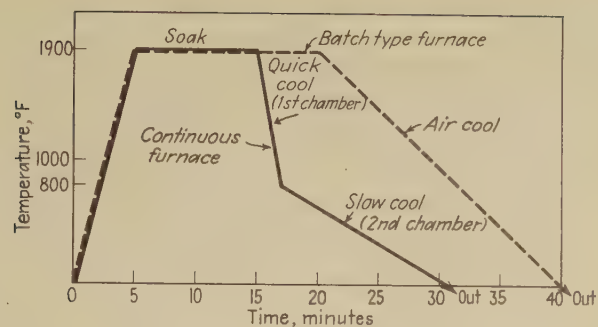


FIG. 3 - Typical time-temperature curves for the continuous furnace and for the batch type furnace.

to prevent reprecipitation of carbides.

The overall length of this furnace is 32 ft, which includes the charging table, the heating chamber, the cooling chamber and the discharge table. The heating chamber is $9\frac{1}{2}$ ft long, of which 7 ft is the active heating length and the remainder is for the rapid transfer of the work from the heating to the cooling chamber. The working width of this furnace is 24 in. with the maximum height of shells that can be accommodated a little under 12 in.

Two trays can be accommodated within the first section of the cooling chamber and three trays in the second section. This second section not only permits further cooling of the work, but also minimizes discoloration when the work is discharged into the air. This has proven especially advantageous when low carbon sheet steel had to be full annealed in this furnace.

The maximum operating temperature of this installation is 2050°F; however, the operating range usually employed in the annealing of stainless parts is from 1850° to 1900°F. The time cycle for 16 shells on a tray is approximately 15 min, of which 5 min is allowed for the work to come to heat, with the remaining 10 min considered soaking time at the annealing heat. The automatic feature of this furnace is particularly desirable for it minimizes the time during which air may infiltrate into the furnace, and conversely minimizes the loss of atmosphere. For the particular gage of stainless used at this plant, the recircled quick air cool is sufficient to prevent reprecipitation of the harmful carbide formation. However, it is realized that in heavier gases a water quench would be mandatory.

The furnace is rated at 100 kw divided into two circuits, each automatically controlled, each single phase. The equipment is arranged to operate on a 550 v, 3 phase, 60 cycle power circuit. Heating of a gross weight of 550 lb per hr to a temperature of 1900°F requires approximately 80 kw-hr per hr. The atmosphere converter uses 450 cu ft per hr of city gas and approximately 100 gal per hr of water. The cooling chamber section of the furnace consumes approximately 400 gal per hr of water.

The electric heating units have proved very satisfactory, with the original elements still in operation. A ribbon type element is employed, the ribbon being of fairly heavy cross-section. In

this particular furnace there are heating units on both the roof and the two side walls.

Typical time-temperature curves for both the oil-fired batch type furnace and the new electric continuous unit are shown in fig. 3. The atmosphere now being used to protect the work is considered the most economical under the existing conditions. The analysis of the prepared gas as it enters the furnace is approximately as follows: 18.0 pct H_2 , 11.0 pct CO, 4.0 pct CO_2 , 1.0 pct hydrocarbons; remainder nitrogen and a small amount of water vapor.

Of importance in maintaining the quality of stainless steel parts is the location of the continuous furnace. The furnace was placed in the press room where the majority of the stainless steel parts are formed, thus eliminating excessive transportation of shells. Promptly after working, the shells are cleaned in a continuous type washing machine located in the same room, and then immediately placed in clean crates for subsequent annealing. Cleanliness has and always will be a guiding factor in the handling of stainless parts.

The immediate effect of the use of the continuous furnace was the reduction of the pickling time required to remove surface scale. Previous practice resulted in a tight adherent scale, the color of which varied from a black to a deep grayish, and offering various degrees of resistance to the pickling action. The scale produced in the continuous atmosphere furnace is a sooty black, which can easily be partially rubbed off with a rag. Based on tests and production records, an average of 12 min is required to pickle the shells annealed under atmosphere, the high being 16 min and the low 10 min. Compared with an average time of 30 min required to pickle a shell annealed in the batch type furnace, pickling output with the continuous atmosphere furnace was increased about $2\frac{1}{2}$ times. Another advantage of the continuous furnace was the ease with which the shells could be scrubbed after rinsing. In some cases scrubbing was completely eliminated by a dilute nitric acid dip requiring but a few seconds.

Due to the decreased time of the pickling bath, the number of rejections due to over-pickling, both from the standpoint of surface condition and reworking, were reduced considerably. Pickled containers that are annealed under at-

mosphere have a semi-matte silvery finish, this finish being quite uniform within a batch of shells. This uniform surface is extremely conducive to polishing where this is required. That the anneal is quite uniform is reflected not only in the surface condition obtained by pickling, but also in the decrease in mechanical failures upon subsequent reworking. This is also true in an operation such as electropolishing where any defect on the inside of a container is accentuated.

Due to the variety of parts that are made from stainless steel, the savings in labor due to increased production is variable. Thus, on small items, the savings per unit group of shells is considerably lower than that experienced in the larger type shell (such as one with a 6-in. diam, 9 in. high). However, an excellent estimate can be given on one particular type shell. On the basis of original investment of \$36,000 for both the equipment and erection, the furnace has realized savings of an equal amount in labor in approximately 36 weeks, assuming that this specific shell was annealed continuously on the basis of an 8 hr day, 5 day week. However, the actual period of time required to realize the original investment has been greater, approximately 76 weeks, since operation of this furnace at the time of its installation has been on the basis of a 6 hr day, 4 day week. Also, the smaller parts to be annealed substantially reduced the potential savings.

A typical example of the advantages accruing from the use of this new continuous furnace, and based on the shell mentioned immediately above, is given in table I.

In considering the annealing operation, the advantage has been not only in increased production per manhour, but also in the fact that instead of the two men required to operate the

TABLE I

Comparison of Production and Costs
Batch Type v. Continuous Furnace

(1) Quantity of shells annealed per hr:	
Batch type furnace	180
Continuous atmosphere furnace	400
Increase, pct	245
(2) Cost to anneal 100 shells:	
Batch type furnace	\$0.70
Continuous atmosphere furnace	\$0.30*
Savings	\$0.40
(3) Cost to pickle 100 shells:	
Batch type furnace	\$0.95
Continuous atmosphere furnace	\$0.50*
Savings	\$0.45

* Estimate

batch type furnace, the continuous furnace requires only one man to feed the furnace and one woman operator to unload.

Scrap rejections in the batch type furnace had been averaging, on an overall basis, 3 pct, while the loss with the continuous atmosphere furnace has been consistently around 1 pct. The continuous furnace has also been used quite extensively for annealing fabricated low carbon and medium carbon parts to relieve stresses caused by the mechanical working, with some modification of the flow of cooling water in the water-jacketed cooling chamber.

The maintenance requirements of the continuous furnace have been negligible. The original heating elements, rolls, etc., are still in service, replacements having been limited to an occasional thermometer, light bulb, etc. By comparison, the batch type furnace required relining every 18 to 24 months, particularly in the arch toward the front of the furnace.

Effective Use of Fasteners

(Continued from page 83)

motion. His initial request to the Sales Dept. is referred to the Engineering Service Dept. which reviews the applications. All phases of the overall design are investigated. Tests to substantiate any theories are made, even as to the use of competitive fasteners. Experimental fasteners are made and tested to compare results with standard fasteners. After a thorough investigation, recommendations are made to the designer. These recommendations are made on the basis of the

tests, production facilities, manufacturing procedure, material procurement and costs. As each factor is handled by a separate department, the accuracy and performance of the recommended fasteners is a measure of the close cooperation of all the functions of manufacturing and selling of fasteners. The performances of the fasteners in the finished unit are a measure of the close cooperation of the designer and the fastener manufacturer.

Commercial Process for Brazing Magnesium

A COMMERCIAL process for brazing magnesium, practicable for all the commonly used methods—furnace, flux dip and torch techniques—has been developed by Dow Chemical Co., Midland, Mich. Dow mixed-chloride type fluxes, containing sodium, potassium and lithium with alkaline fluoride additions, are used to permit capillary flow. Brazing temperatures are between 1075° and 1160°F.

Dowmetal M is the only alloy as yet being brazed on a commercial basis, but experimental work with other alloys is in progress.

Brazing alloys being used are the regular Dowmetal C alloy, containing 9 pct Al, 2 pct Zn and 0.2 pct Mn, and a special low melting point alloy, designated AZ-125, containing 12 pct Al 5 pct Zn and 0.2 pct Mn.

Sheet Metals for High Temperature Service

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Results of an investigation conducted for the purpose of evaluating sheet metals for high temperature applications are presented in this article. The study has been prompted by frequently encountered warpage, buckling and ultimate failure of heat-resistant metals currently being used in such assemblies as jet exhaust stacks, tail cones, combustion chambers and exhaust manifolds. The effects of repeated flame impingement on the behavior of common high temperature alloys and composite (clad) materials are illustrated and discussed.

THE rapid development of the aircraft gas turbine and various other sources of jet power have imposed increasingly severe requirements on materials used in their fabrication, and as a result innumerable metallurgical difficulties have arisen, the majority of which have related directly to the metallic components exposed to elevated temperatures in service. Understandably, the major portion of recent metallurgical research, productive of the so-called superalloys has been devoted primarily toward the improvement of the more critical moving parts of the turbine (turbine discs and blading) with somewhat less emphasis placed on the development and application of sheet materials for exhaust stacks, tail cones, combustion chambers, etc.

However, the sheet metal construction which comprises the bulk of combustion systems has constituted a serious metallurgical problem and in the case of flame tubes has become a limiting factor in the service life of current jet engines. This has applied to engines of German and British design as well as those manufactured in the United States. It is observed that the repeated alteration of alloy specifications and/or profligate use of strategic alloys has resulted in no substantial reduction in distortion of combustion tube liners or improvement in service life of these and similar components. This may serve as an indication that requirements of sheet metals for high temperature service may differ considerably from those of such parts as rotors and blading.

Factors of inherently poor thermal conductivity and high thermal expansion are quite characteristic of the most promising of available high temperature alloys, and therefore thin sheet sections which are particularly susceptible to the deleterious effects of localized heating and flame impingement, resulting in warpage, distortion and failure from thermal stress gradients, have proven a most prolific source of trouble in turbo-engines.

A review and analysis of failures previously occurring in sheet metal parts operating at elevated temperatures—exhaust stacks, collector rings and the familiar exhaust manifolds for reciprocating engines, —has indicated a marked similarity of attendant metallurgical difficulties to those more recently associated with jet propulsion. Formerly,



FIG. 1 - Flame impingement test showing star shaped flame at interior of tube during rotation.

problems of distortion, thermal fatigue, etc., were solved with moderate satisfaction by such expedients as the increase of sheet thickness or modification of design in critical areas to effectively reduce thermal stress gradients. However, where these methods were not practicable, or tolerable from a standpoint of excessive weight, steps have been taken to reduce the severity of localized heating by the use of composite materials of higher thermal conductivity. The application of aluminum fins to engine cylinder barrels and the copper cladding of stainless steel cooking utensils are examples of this approach.

It is significant to note that recent experimental engines (ramjets as well as turbojets) are, in the main, constructed of conventional alloys and are provided with rather elaborate means of external cooling. This may serve to emphasize that available materials have become such a critical metallurgical problem that a point has been reached where engineering design improvements have become mandatory, particularly when it is fully appreciated that standards of design may change entirely with increase in operational temperatures, and that the indiscriminate specification of superalloys may not only be useless and wasteful, but may actually result in the production of less satisfactory parts.

Despite optimistic predictions by some sources, it is unlikely that alloy development can keep pace with the engine designers' rapidly increasing demands for materials to successfully withstand higher and higher temperatures. These demands are perhaps justifiable in many respects, for the efficiency of the gas turbine or other jet power plant is dependent largely upon the temperatures at which specific components operate. It has been asserted that an increase of 100°F in operating temperature may improve thermal efficiency as much as 30 pct, and therefore in future designs, external cooling of specific parts will not be tolerated, and does not in itself constitute a satisfactory solution to the extant problems which is resolved into one of temperature differential and not temperature level.

Particular emphasis may be placed on this observation when the adverse effects of flame

tube warpage on combustion efficiency are considered. It has been stated that flame tubes do not operate at uniform temperature, that they must resist scaling, distortion, cracking and fatigue effects, and that they must be light in weight, a combination of factors difficult to obtain in a single material.

Therefore, the solution to this and directly related problems of warpage, distortion, etc., encountered in tail pipes, cones and other sheet metal parts for high temperature service appears to rest with initial design providing for maximum uniformity of heat application and the augmentation of such design with materials capable of distributing unavoidably localized heat before prohibitively high temperatures are reached at points of heat impingement, thereby avoiding destructive thermal stress gradients without diminution of thermal efficiency.

The inadequacies of the more common laboratory tests (stress-rupture, creep, etc.) in accurately and completely evaluating materials, particularly those in sheet form, for service over wide extremes of temperature have emphasized the necessity of testing under conditions simulating those encountered in actual service, and hence, the apparatus illustrated in fig. 1 was designed for use in the investigation described in this article.

Tubular test specimens, 2 in. ID x 5 in. in length (fabricated by forming and spot-welding of the various sheet alloys) were mounted on rotating spindles (1 rpm) while localized heating 1½ in. from one end was effected by radial oxygen natural gas flame jets impinging upon the inner surface of the tube specimen. Rotation of specimens was found to be an expedient method of avoiding hot spots in the tube wall at each of the eight points of flame impingement. Application of flame and local heating of tubes to approximately 1500° to 2000°F in hottest region (depending upon the thermal conductivity of the particular material in test, but also upon related effects of emissivity, radiation losses, reflectivity, etc.) continued for a period of 5 min, and was followed by cooling for 1 min in still air.

Flame tip temperatures recorded periodically during the test program were shown to be remarkably constant for a given pressure and valve setting of oxygen and natural gas supply. The test cycle, including one heating and one cooling phase, was fully controlled and was automatically repeated until the first visible indication of circumferential cracking was noted.

The sheet alloys studied in this investigation include: Type 302 (304) stainless steel; type 321 stainless steel; type 347 stainless steel; Inconel; Inconel B (No. 22); N-155 (low carbon); type 317 modified stainless steel; type 430 stainless steel; Vitallium (Haynes Stellite No. 21); S-816; Hastelloy C; 19-9 DL; 19-9 W-Mo; Inconel X.

During the initial stages of impingement testing, several interesting observations with regard to the behavior of the various materials were made. Visibly wide variations in distribution of temperature along the length of tubular specimens are illustrated in figs. 2 and 3, from which it becomes apparent that thermal conductivity has a pronounced effect on temperature gradients in specimens of the different alloys. It was noted that the ability of materials to distribute local-

ized heat decreases quite noticeably, as judged visually and by actual temperature measurement, with the progress of alloy deterioration by scaling, oxidation, incipient fusion effects at grain boundaries and other phenomena. Copper plating of specimens effectively lessened the amount of deformation and in some instances resulted in slight increases in test life of materials treated in this manner, or originally anticipated.

However, full advantages of improvements in conductivity and visible diminution of thermal gradients were not realized since electrodeposited coatings were quite subject to blistering, oxidation, flaking, and premature deterioration in spite of the application of various exterior oxidation resistant coatings (nickel and chromium) over high conductivity under coating (copper). It was also indicated that heavy pickling and severe surface treatments necessary to obtain adequate adhesion of coatings may have contributed to somewhat premature failure of base metal in some specimens. For these reasons many of the data for plated specimens have not been included with those of other materials.

Examination of test specimens after failure by circumferential cracking or burnout in regions exposed to highest temperatures yielded qualitative data concerning the behavior of the various materials from a standpoint of distortion remaining after testing. It is to be emphasized that visible deformations were not the result of any applied external load, flame pressures, etc., but of thermal expansion and permanent upsetting. Of interest is the accordion buckling which was observed in conventional stainless types 302, 321, 347, Inconel, Vitallium, 19-9W-Mo, 19-9DL, and Inconel X. Somewhat more severe buckling was noted in type 430 stainless, Inconel clad copper, Inconel clad nickel and Pluramelt, although in the case of Inconel clad copper and nickel such deformation occurred only during the last cycles of test. Materials of heavy gage (type 302 stainless, 0.063 in.; N-155, 0.061 in.; type 317 stainless, 0.042 in.; S-816, 0.039 in.; Hastelloy C, 0.066 in.) showed lesser amounts of deformation throughout testing period and hence gave little indication of impending failure prior to final splitting.

The results of flame impingement tests are summarized and illustrated in the chart shown in fig. 4, wherein the length of white bar represents the spread in number of cycles-to-failure for materials tested to destruction. The black dot in each bar indicates the average number of cycles for specimens of each alloy. In studying this chart, it may be well to note; (1) the effects of electroplating type 302 stainless, type 321 stainless, type 347 stainless, standard Inconel, Vitallium, Hastelloy C, (2) the effects of increased sheet thickness on type 302 stainless, type 317 stainless, low carbon N-155, Hastelloy C, S-816 and (3) the wide spread of values shown for type 317 modified stainless, Vitallium, S-816, Inconel-clad nickel and Inconel-clad copper.

In efforts to compare the test life of various materials with respect to interrelated factors of thermal conductivity and expansion, the charts shown in figs. 5 and 6 were prepared from available information in the literature. It is fully appreciated that the data are far from being

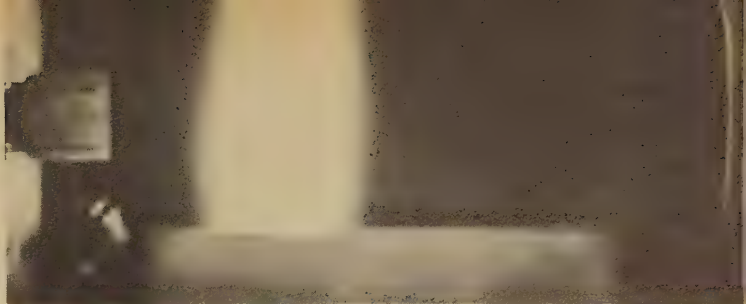


FIG. 2 - Appearance of temperature distribution during test of low conductivity materials.



FIG. 3 - Appearance of temperature distribution during test of high conductivity materials.

complete, but may serve as indications of comparable properties.

Conductivity curves shown in fig. 5 must be considered as approximations in instances where few points are plotted over the temperature range (Inconel X), and where calculated aggregate conductivities of composite (clad) metals are indicated, e.g., Inconel-clad copper, Inconel-clad nickel, aluminized steel and stainless-clad low carbon steel. However, the wide differences in thermal conductivity of the several materials charted are quite evident. The tendency of highly alloyed materials to increase in thermal conductivity with increase in temperature is noted, as is the proneness of purer metals to decrease in conductivity with temperature increase.

A comparison of mean thermal expansion coefficients in several temperature ranges is presented in the chart of fig. 6. Again, the curves shown cannot be considered completely accurate, particularly where the number of plotted points is limited. The data illustrated do, however, serve to indicate generally valid contrasts between coefficients of different materials.

Fig. 7 illustrates temperature distribution over the length of tubular specimens during test. Point values shown represent averages of several temperature measurements taken in different specimens of each material, and when values for different materials were found to coincide within approximately 25°F, these were assembled into typical curves (Nos. 1, 2, 4, and 5). Temperature measurements were obtained using a potentiometer in connection with chromel-alumel thermocouples embedded at indicated points in the wall of tubular specimens. Couples were securely retained during rotation of specimens by peening of the metal adjacent to small holes into which

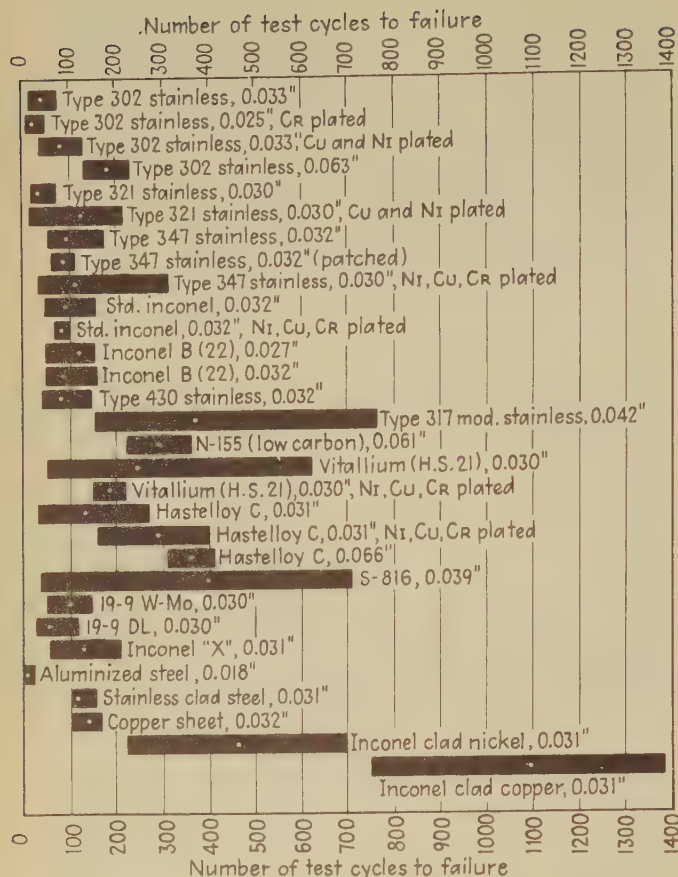


FIG. 4 - Summarized results of flame impingement.

the tip of the couple had been inserted. Measurements were made after near-equilibrium temperatures were reached (4 to 4½ min after start of the flame impingement phase of test cycle) and therefore values indicate the actual maxima temperatures attained by the tube wall.

It appears from consideration of fig. 7 that temperature gradients are essentially a function of thermal conductivity of the particular material as would normally be expected, and although minor effects of reflectivity, emissivity, radiation losses, etc., may contribute to slight deviations, the thermal gradients decrease with increasing conductivity without exception. It is observed that with a constant flame temperature (and configuration) a temperature variation of more than 1400°F occurs in such alloys as Inconel X, S-816, Vitallium, Hastelloy C and N-155, while higher conductivity materials show temperature differentials as low as 400° to 450°F.

The structural behavior of several of the alloys tested by local flame impingement is illustrated in the sectional micrographs of figs. 8 and 9. Microstructures of parent metal (unaffected by heating), heat affected regions and areas of failure are present. Of particular interest are the austenitic types of structures in parent metal of N-155, Vitallium, Hastelloy C and S-816, all of which show dispersion of complex carbides. With the exception of 19-

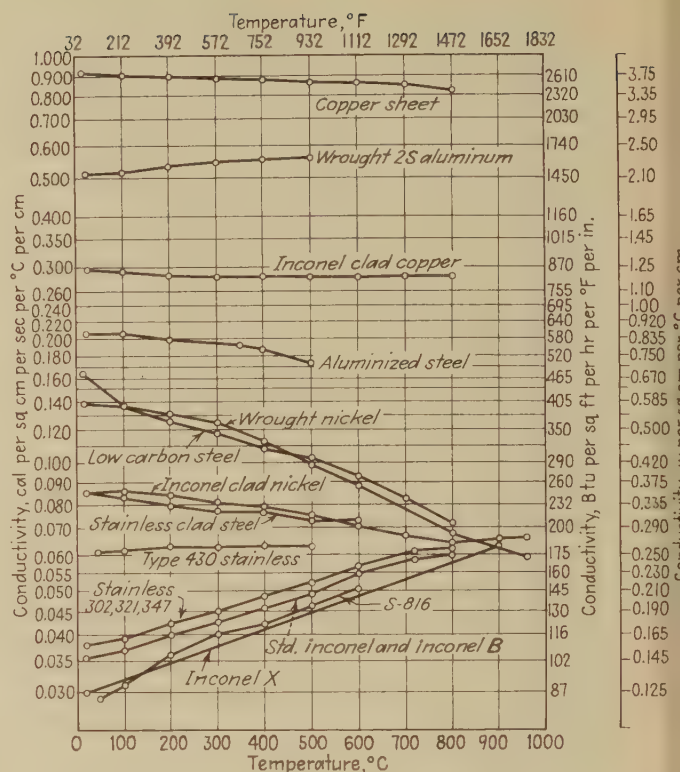


FIG. 5 - Thermal conductivity of sheet materials.

9W-Mo all materials exhibit heavy precipitation in heat affected areas. Intercrystalline failures occur in materials other than 19-9 alloys which indicated rather smooth fractures. It is noted that N-155, Vitallium, Hastelloy C and S-816 alloys do not show appreciable grain growth in re-solution zone at fracture.

Upon examination of results shown in this investigation, it becomes apparent that severe temperature gradients occurring in sheet metal assemblies subject to repeated and local applications of heat are the primary source of warpage, buckling and ultimate complete failure by cracking of such components with no load factor other than that imposed by self-support of the assembly. It has been demonstrated that thermal conductivity has a very significant effect upon the development of destructive thermal stress gradients and that from this standpoint, the use of newer, current, and proposed high temperature alloys, inherently of very poor conductivity and high thermal expansion will result in no significant improvement in resistance to failure of sheet metal parts under service conditions of non-uniform heating.

These observations, however, detract nothing from other requisites of high temperature alloys; i.e., sufficient oxidation resistance, low rate of creep and adequate strength characteristics at elevated temperatures; neither is the necessity

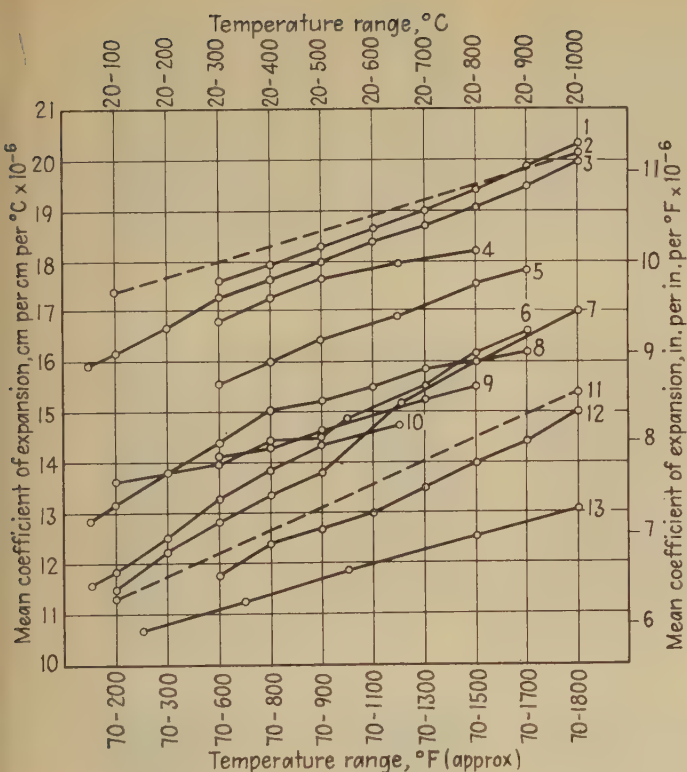


FIG. 6 - Thermal expansion of sheet materials. The curves are identified as follows: (1) commercial copper; (2) type 317 stainless; (3) types 302, 304, 321 and 347 stainless; (4) 19-9 DL, (5) N-155 low carbon; (6) Inconel X; (7) Standard Inconel and Inconel B (22); (8) nickel; (9) vitallium (H.S. No. 21); (10) low carbon steel; (11) Hastelloy C; (12) S-816; (13) type 430 stainless.

of development and testing for these properties minimized. It is merely emphasized that properties of thermal conductivity and expansion become of increasingly greater importance in locally heated thin sheet than is commonly realized. Further, relatively insignificant improvement in thermal conductivity will quite substantially inhibit distortion and failure by diminution of thermal gradients, whereas more appreciable enhancement of other properties, such as high temperature strength, oxidation and creep resistance, expansion, etc., will be required to produce an equivalent effect in prolonging the service life of sheet metals under local impingement by flame and/or hot gases.

In observing the mechanism by which sheet metals warp and crack under repeated local heat application it is indicated that initially, local expansion takes place causing deformation, displacement, and upsetting in areas of highest temperature due to restrictive and opposing force of surrounding cooler metal. Upon subsequent cooling, stresses imposed upon displaced metal by contraction of a greater volume of surrounding (cooler) metal may be of sufficient magnitude to cause rupture. Alternate heating and cooling of local areas aggravate this effect by introducing an additional factor of thermal fatigue. It follows then, that more abrupt tem-

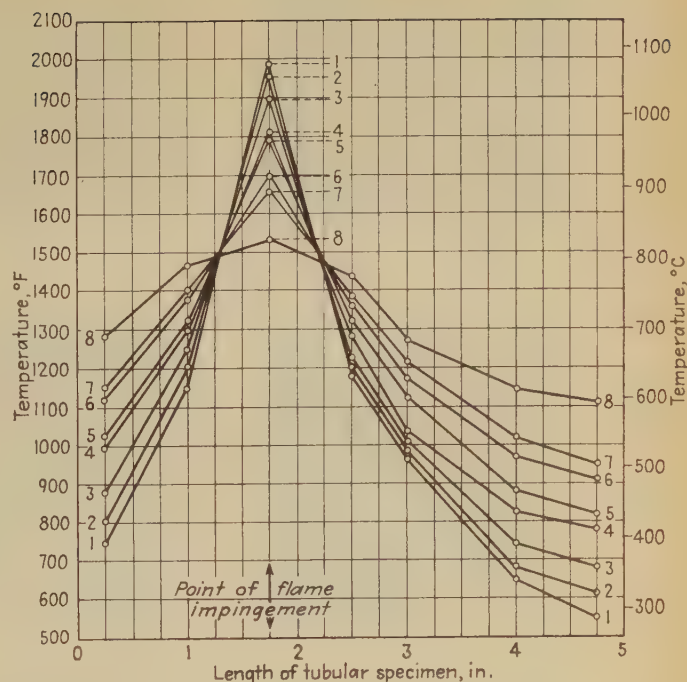


FIG. 7 - Typical temperature distribution curves - impingement test. The curves are identified as follows: (1) Inconel X, S-816, vitallium, Hastelloy C, N-155; (2) stainless types 302, 317 mod., 321, 347, standard Inconel, Inconel B (22), 19-9 W-Mo, 19-9 DL; (3) type 430 stainless; (4) Inconel clad nickel, stainless clad steel; (5) electroplated stainless types 302, 321, 347 and standard Inconel; (6) aluminum coated steel; (7) Inconel clad copper; (8) commercial copper sheet.

perature differentials and greater unit stresses will develop in locally heated materials of poor conductivity and high thermal expansion, wherein heat is not efficiently distributed or dissipated and where the amount of deformation (elastic and plastic) is greater for a given temperature.

This has been reflected in the behavior of materials tested in the present investigation in that the direct relation between length of test life and thermal conductivity is particularly pronounced. In addition, it has been noted that for a given number of test cycles, substantially less warpage and other distortion occurs in tubular specimens of high conductivity and/or of low expansion. The general improvement in test life of heavier gage materials is directly ascribed to effective increase in thermal conductivity of tube walls.

It is obvious that such materials as type 430 stainless steel (ferritic), aluminum coated low carbon steel, copper sheet, and others cannot reasonably be specified in applications where any benefit of their properties of relatively high conductivity and low expansion are more than offset by deficiencies attending their service at temperatures in excess of those causing rapid oxidation, scaling or serious impairment of strength characteristics. With specific reference to improvements in thermal conductivity by application of electrodeposited coatings, it appears that

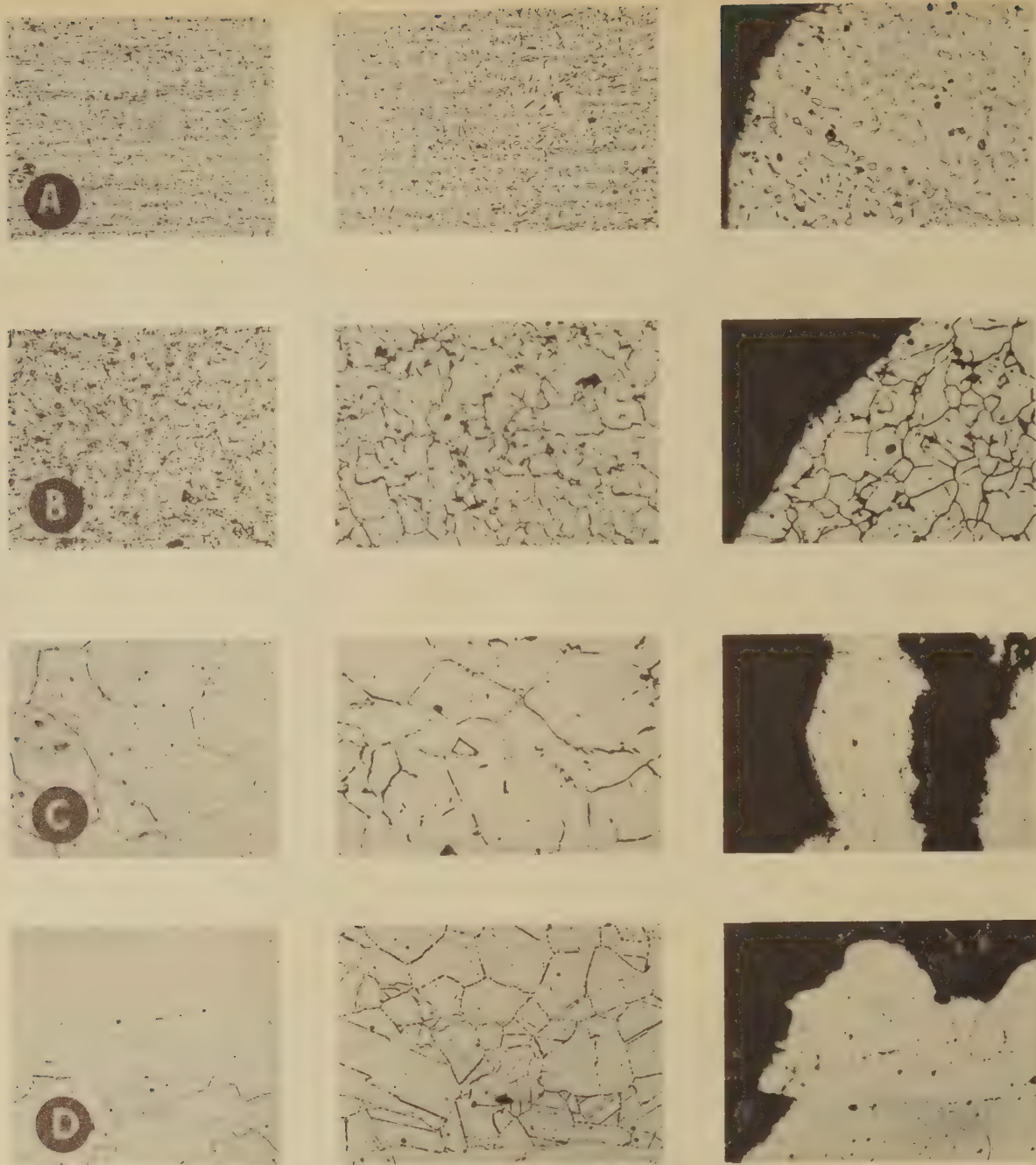


FIG. 8 - Microstructures of high temperature alloys showing (left to right) parent metal, heat affected transition zones and structure at point of failure. (A) N-155, etched electrolytically in chromic acid; (B) Vitallium etched electrolytically in chromic acid; (C) Hastelloy C, etched electrolytically in chromic acid; (D) S-816, etched electrolytically in hydrochloric acid. 200X

slight benefits realized in some instances may be due to effective increase in thickness of material, and therefore in conductivity, and not particularly to benefits derived directly from superlative conductivity of coating metals. The lack of adequate initial adhesion, predilections toward oxidation, blistering, and scaling, wide differences in thermal expansion between base and plated layers, requirements of inordinately heavy (and protected) coatings, and other limitations of the electroplating process would seem to make very unlikely any extensive future use of such methods to attain increased thermal conductivity in applications where sheet metals are exposed to unavoidable temperature variations.

Conversely, the clad materials tested in this program have shown considerable promise in improving characteristics of distortion and extend-

ing the life of parts subjected to repeated local flame impingement, and it has become evident that such materials, particularly Inconel-clad copper and very likely stainless clad copper, may well offer the optimum balance or combination of properties necessary to meet many of the more severe requirements of sheet metals in high temperature service.

It is anticipated that the application of high conductivity clad metals to sheet assembly components will not only result in more satisfactory service life of such parts, but in greater overall efficiency of power plants due to the maintenance of critical shape and dimensional tolerance. It may be noted that greater engine efficiency may derive from effective increase in permissible operating temperatures by virtue of minimized temperature gradients. Future ap-

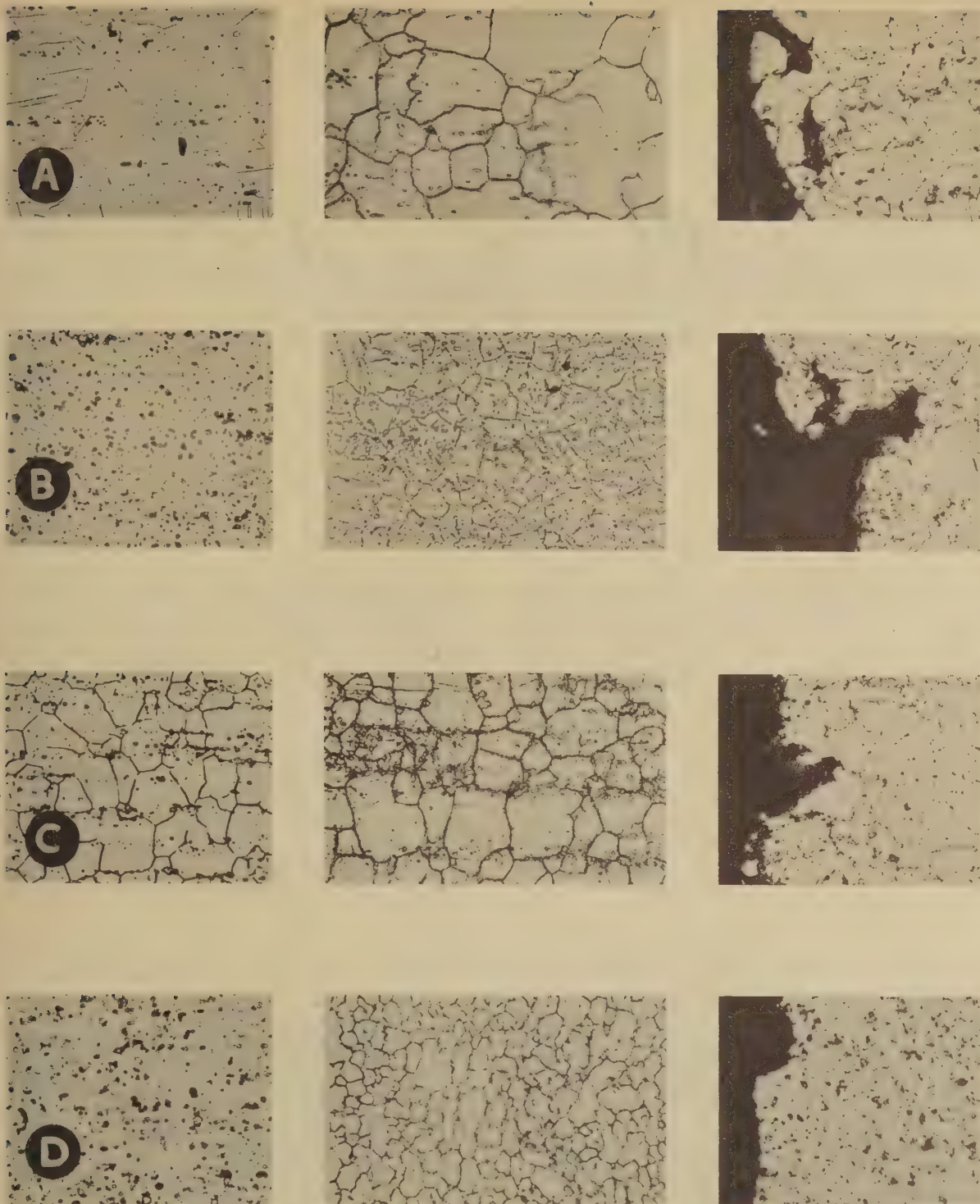


FIG. 9 - Microstructures of high temperature alloys showing (left to right) parent metal, heat affected transition zones and structure at failure. (A) 19-9 WMO, etched electrolytically in oxalic acid; (B) 19-9 DL, etched electrolytically in oxalic acid; (C) Inconel X, etched electrolytically in oxalic acid; (D) stainless clad low carbon sheet, etched electrolytically in oxalic acid. 200X

plications of sheet metal combustion chambers, ducting, etc., in which internal pressures increase to a point where load-carrying capacity becomes requisite, and where problems of thermal fatigue become even more serious than here-

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tofore, may reasonably require clad metals from standpoints of high temperature strength, oxidation and corrosion resistance, as well as proficiency in distribution of localized heat. In addition, the use of lighter insulating blankets and supporting members may logically be made possible in assemblies where severe local hot spots do not occur. Over and above the foregoing considerations and obvious economic advantages, the utilization of clad metals may be found to be an expedient conservation measure during periods of critical alloy shortages.

Welding Banjo Type Axles at Ford

By WALTER KROY
Assistant Welding Engineer,
Ford Motor Co., Dearborn

REAR axles for Ford passenger cars, made at the Ford Mound Road plant are built to a new design that includes a banjo-type center of which the ring-shaped portion is formed integrally with tubes in two halves. Each half has a semi-circular yoke and the mating ends of these are butt welded. Other permanent joints of the housing are made by one or another of several welding machines equipped with special fixtures and operated on a semi-automatic basis where the operator loads and unloads the machine.

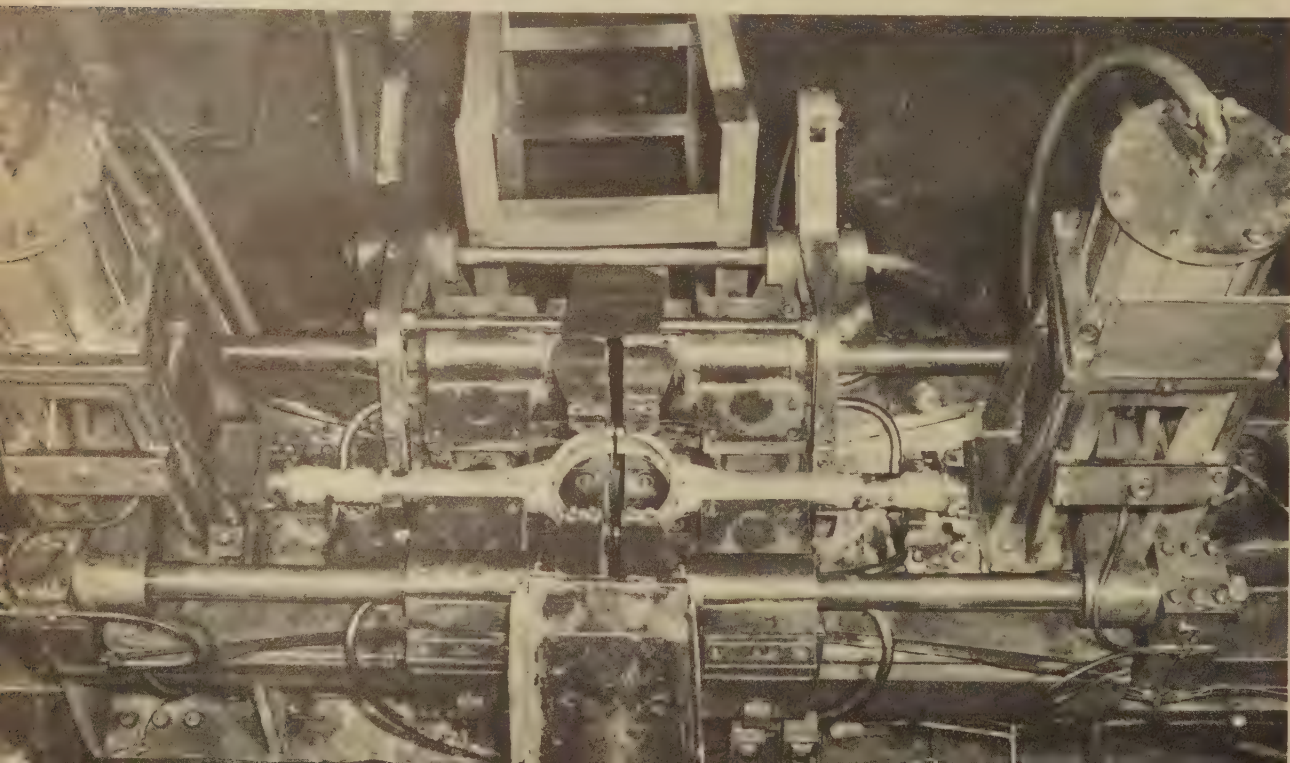
With this type of assembly, labor costs are minimized and the machines are largely respons-

ible for rapid, high quality welds that contribute to economy in manufacture. In addition, human factors are minimized and mechanical problems are left more for foremen and setup men than for welder operators to handle.

Machines are controlled mainly by automatic electronic means selected by the machine designer on the basis of dependability, precise timing and overall efficiency. If the setup is properly made and the machine is correctly loaded and adjusted, substantially perfect welds are almost certain.

After the two major parts of the axles are formed, they are passed through a washer em-

FIG. 1 - This rear view of a welding setup shows two halves of the axle in a Swift welding machine which, when shield is lowered, butt welds these parts together. After welding the assembly is air ejected by bellcranks onto the stock rack in foreground.



With the banjo type axle just adopted for Ford cars, an unusual welding sequence was developed to fabricate the assembly. Buttwelding, spotwelding, arcwelding and projection welding are all used in this assembly and accomplished automatically. The production process is described herein.

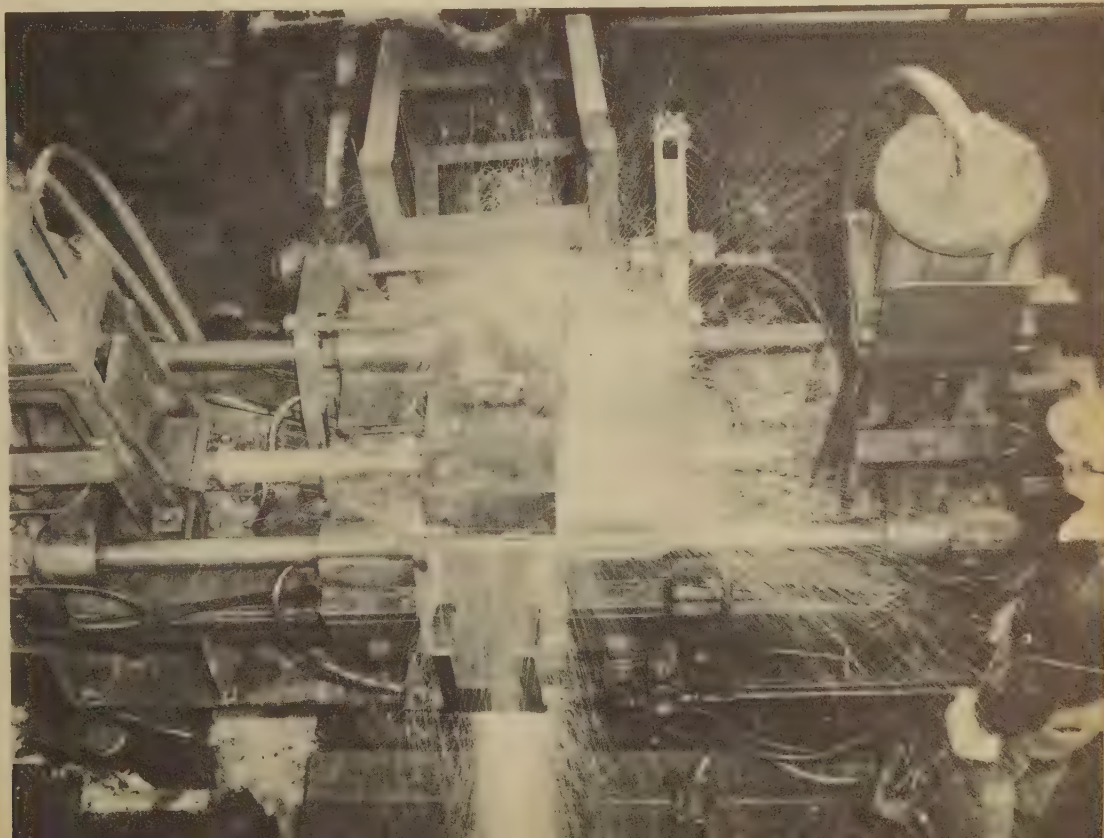
ploying a hot alkaline solution and reach the welding department free of oil and grease, ready for assembly. Here, these halves are first set into a Swift butt welder, as shown in fig. 1, and are clamped by holding dies at each side. The flash shield is then swung into place and the operator presses a treadle switch that starts the welding cycle.

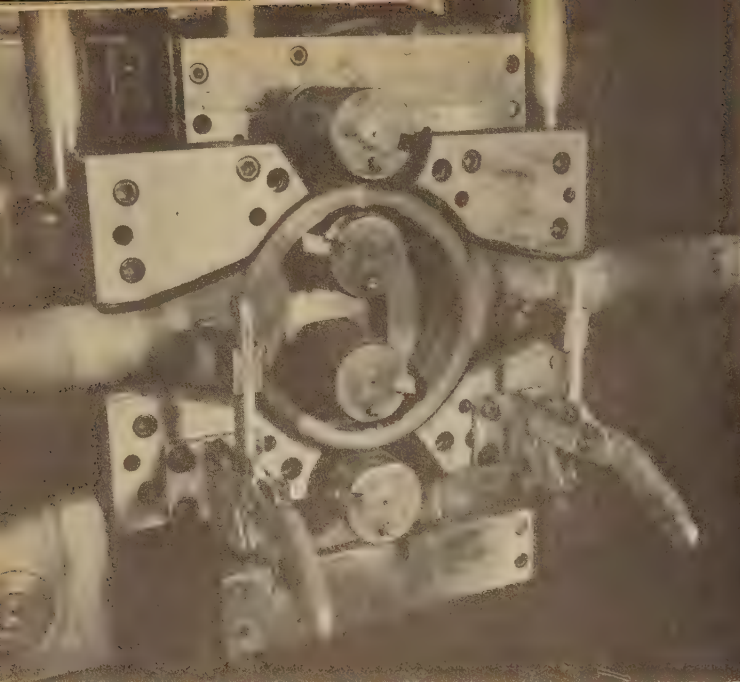
In this cycle, the two halves are brought together and both current and pressure are applied to effect the weld shown in process in fig. 2. When the weld is completed, the machine automatically shuts off the current and the operator presses a control that unlocks and ejects the as-

sembly. The latter is accomplished by a pair of bellcranks pivoted on a rear shaft that is rocked by an air cylinder. At the inner ends, the bellcranks each have a hook that, during welding, rests below the axle. As the bellcranks are rocked, the assembly is lifted and rolls down the arm of the bellcranks onto a stock rack adjacent to a Cleveland press that trims off the flash formed at the welds.

When shifted into this press, the central housing rests in supports shown in fig. 3 and is pressed inward by a pair of toggle clamps. Cutter blades (of which only two of four are shown in place) are locked in key slots of stub shafts that

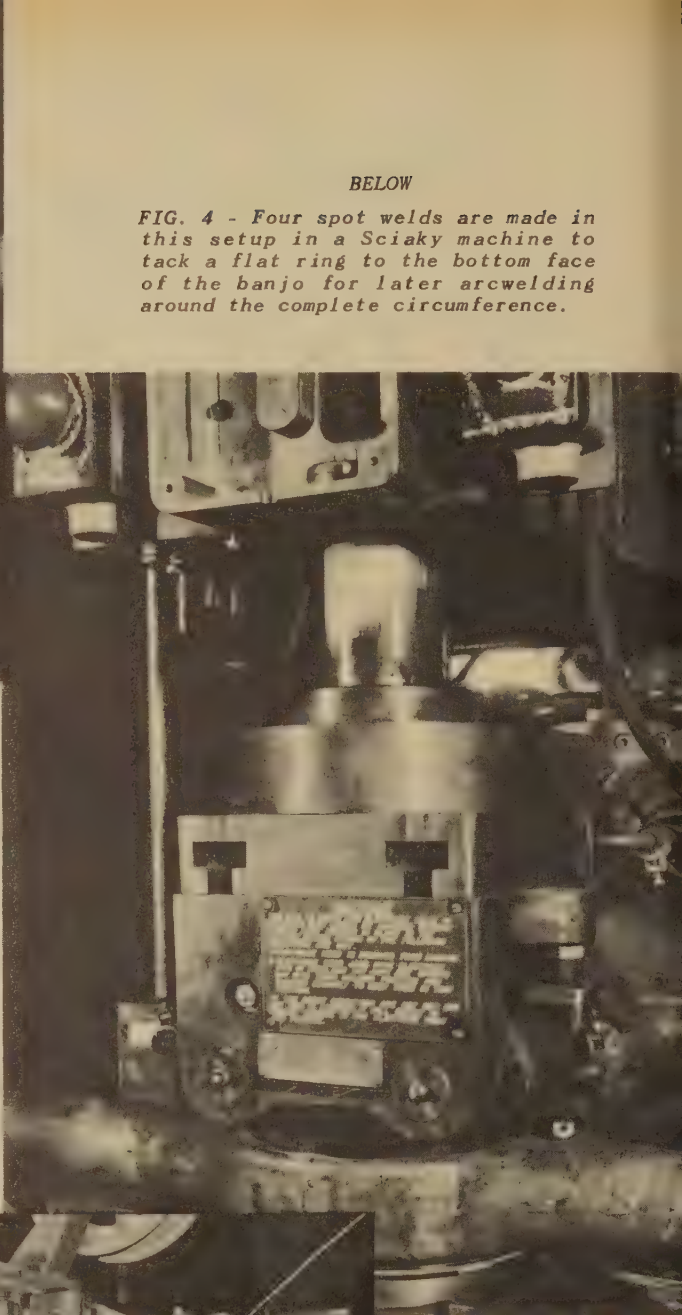
FIG. 2 - With the axle halves in the Swift welder (front view) the shield is lowered while buttwelding two joints, one at each side of the channel shaped yokes that form the banjo frame of the differential housing.





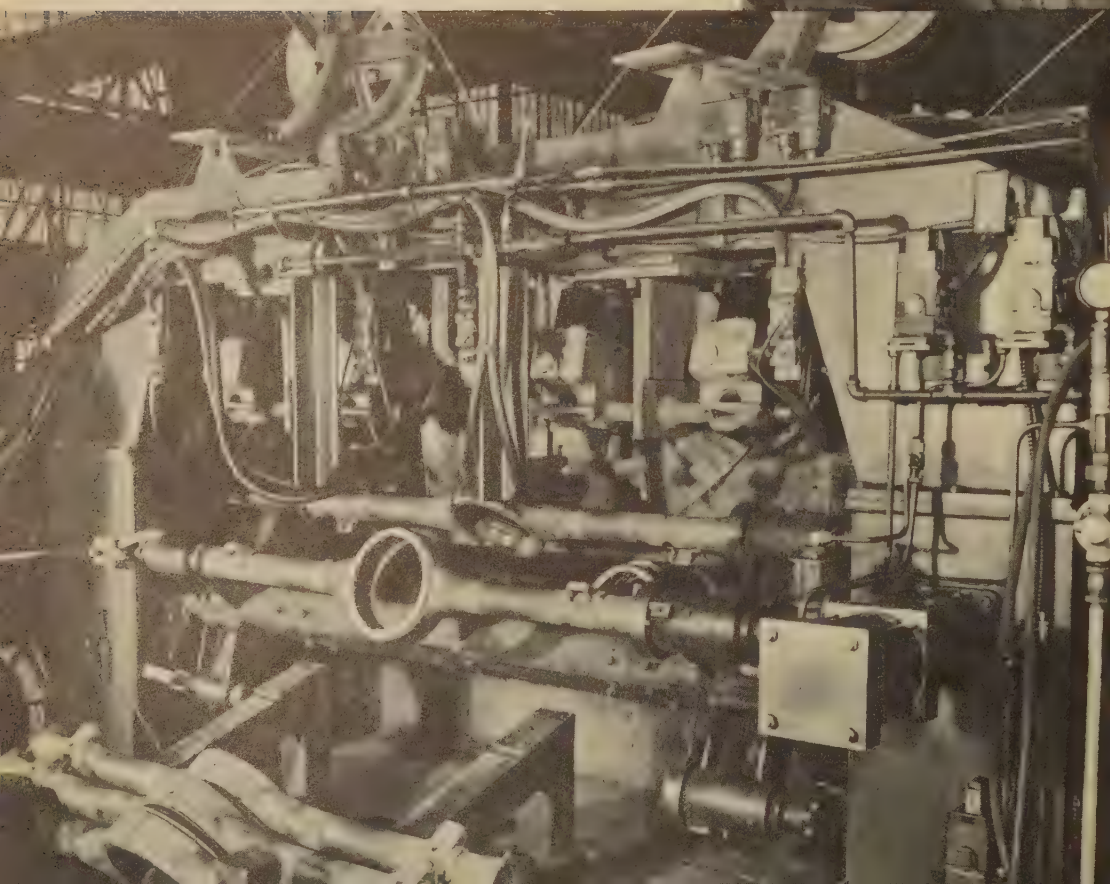
ABOVE

FIG. 3 - After butt welding, the axle assembly is set in this fixture on a Cleveland press equipped with crank-operated cutter shafts that are rocked to shear weld flash both inside and outside the banjo channel.



BELOW

FIG. 4 - Four spot welds are made in this setup in a Sciaky machine to tack a flat ring to the bottom face of the banjo for later arc welding around the complete circumference.



LEFT

FIG. 5 - Stamped spring seats are welded automatically near the outer ends of the axle tubes in this Progressive machine. Welding has just been completed on the upper axle in the spider fixture and the second axle, welded in the prior cycle, is about to be ejected from the fixture onto a stock rack.

are made to rock by cranks as the press closes. This rocking motion causes the cutters to shear off flash both inside and outside the channel section. The setting is such that cuts are not made quite flush with surface, as some flash can remain without detriment. Any unwanted excess not thus cut off is hand ground. This leaves the axle ready for the next welding operation.

A stiffening ring of flat stock is spotwelded to what becomes the front face of the axle and is done in the Sciaky machine, shown in fig. 4. Work is held in a simple fixture in which the ring is located below the axle housing as pressure is applied to the latter by the upper electrode. Only four spots are welded, as this operation is only for tacking the ring in preparation for later arcwelding around its full circumference. Before doing the latter, however, the axle is put through a Progressive welder that welds a spring seat to each axle tube near its outer end.

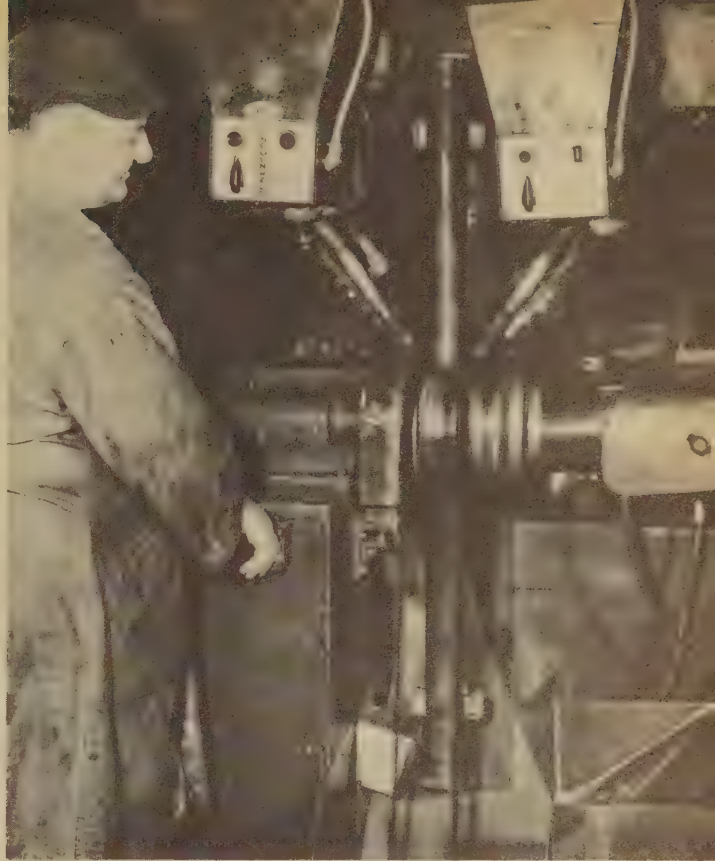
A rear view of this machine and its four-place horizontal rotating fixture is shown in fig. 5. At each end, the fixture has a cross-shaped spider with retracting pins that locate and center the axle with its long axis horizontal and the banjo set in a plane such that the spring seats will be in correct angular position when the welds are made. Each spring seat is a heavy stamping that has an arc shape extension at each side, the arc being of such curvature as to fit the tube where welds are made.

Axles are loaded from the front where they are set into the fixture in such a position that the spring seats can be clamped in the desired location between each pair of electrodes that are uncoated wires fed in automatically from coils at each end of the machine. When the spring seats are in place, a front shield is closed and the operator presses buttons that start the welding cycle, which is then carried through automatically.

As soon as the four arcs are struck, the axle begins to turn slowly about its long axis and continues this angular motion until the four arc-shape welds are completed, fastening each spring seat at each side thereof to the axle with a bead of welded metal. This slow turning continues until the seats come to a position such that they will clear the electrodes. Then the fixture is indexed 90° and the machine goes through another automatic cycle. The operator has another axle ready to put into the fixture as soon as welding on that in the machine is completed.

In indexing, the fixture carries the axle just welded into the rear position shown in fig. 5. There the welds cool while the newly loaded axle is being welded. At the next indexing, the cooled axle passes unlatching devices that withdraw the supporting pins and drop the axle onto an inclined stock rack from which it is transferred to the next machine. In this setup, at least two axles are always in the fixture and spring seats can be welded to 300 axles an hr, which means that four arc welds are made each 12 sec.

For the next operation, the axle is set in a vertical position between the two holding heads of an Expert welder equipped with two Lincoln submerged arc heads, as shown in fig. 6. In fig. 7, a closeup of the axle is shown after two arc welds have been completed, one at each side of the



ABOVE

FIG. 6 - This Expert machine, equipped with two Lincoln submerged arcwelding heads is making two circular welds around the banjo periphery as the axle turns 360° about the banjo axis. Excess flux falls into the hopper below, is sucked up, sifted and reused.

BELOW

FIG. 7 - In the Expert machine after submerged arcwelding around a ring, left, and cover, right, the axle assembly is ready for removal, one holding head, extreme right, having been swung back on its pivot. Part of the weld at left is still covered by lightly adhering flux.





FIG. 8 - Submerged arcwelds at banjo are water tested for leaks. If any are found, the axle is shifted on angles to supporting brackets and the leaks are arcwelded.

banjo, through a full circumference. While these welds are made, the axle is turned 360° about the banjo axis. One weld completes the fastening of the $5/32$ -in. thick ring previously tacked by spotwelding to the banjo and the second weld fastens a stamped 16-gage cover to the opposite face of the banjo.

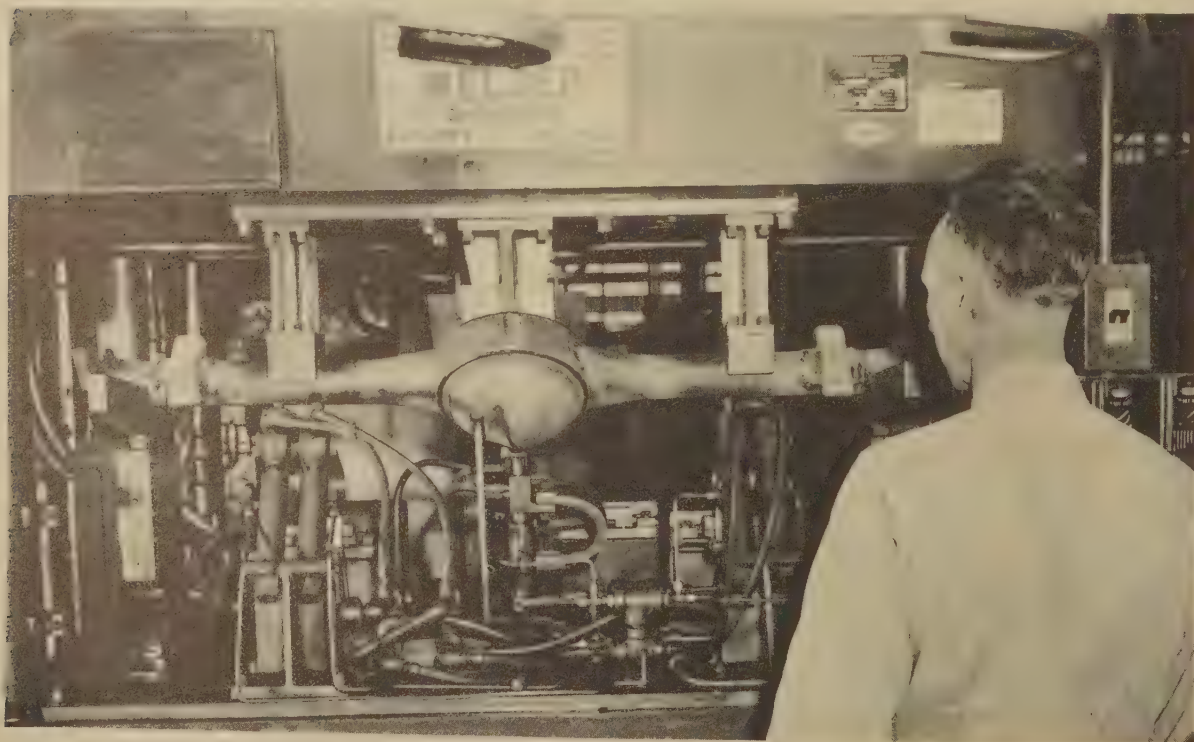
In loading for these operations, the ring side of the banjo is set against one rotatable holding head and the cover fits into a recess in the second rotatable head which is rocked about a vertical pivot while loading and unloading, as shown in fig. 7. Fig. 6 shows the welding in process with the Lincoln heads in place and flux feeding from hoppers over the electrodes to submerge the arcs. Excess flux falls in two streams into a screen covered hopper below the work. From this hopper, the flux is sucked up, sifted and deposited in supply hoppers in a mezzanine location from which this flux, with additions of new flux, is supplied by gravity to welding heads.

This submerged arcwelding is done in a 15-sec. cycle during which each arc consumes 375 amp, dc at 26 to 28 v. The welding rod is $1/8$ -in. diam and is fed automatically. This machine runs through its cycle automatically as the axle is rotated one full revolution and stops, shutting off current at the same time, when the welds are completed.

Then the operator removes the welded axle and inserts another along with a cap that is to be welded to it. While the new welds are made, the operator removes flux adhering to welds made on the prior axle. Resulting welds are clean and uniform and adjacent surfaces are free from spatter. Five identical machines are supplied for making these arc welds.

As both of the arc welds made around the

FIG. 9 - In this Resistance welder, four small brake line clips set, one over the end of each electrode, are projection welded to axle tubes as the axle is held in a locating and supporting fixture.



banjo have to be oil tight to retain the lubricant for the hypoid gears and differential subsequently set inside the banjo, the welds are subjected to a 25 psi water test in the fixture illustrated in fig. 8. If any pinhole or other leaks are found, the operator who makes the test rolls the axle out of the fixture into brackets provided in front of the test fixture and hand welds the part to stop the leaks, after which a new test is made to be sure that the repair is effective.

For the final welding operation, the axle is placed in a Resistance welder, fig. 9, to fasten brake line clips in place by spotwelding. There are four such clips, each having three projections where the welds are made. A large machine is used partly because a large fixture is needed to hold the housing in correct position for proper location of the clips. The latter are small stampings that are set one over the end of each of the four electrodes that are on the ends of hydraulically operated plungers supported in inclined position above the machine bed.

The axle is loaded on bars supported at proper height and is rolled into notches in these bars and locates against stops which are lowered. Correct angular position is assured by a stop against the open face of the banjo. When the axle is in position and clips are over electrodes, the electrodes are automatically pushbutton operated to make all welds simultaneously. Then the stops are withdrawn and the axle is removed by hand.

Before axle housings assembled as described are ready for machining, they are set in the fixture shown in fig. 10 on the bed of a General Flexible Power Press and are gaged for straightness. If slight departures from straightness are

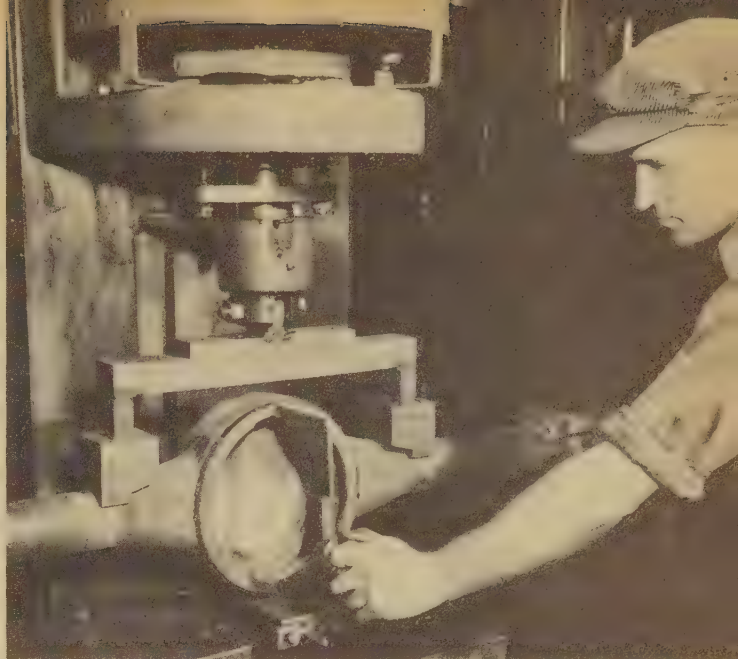
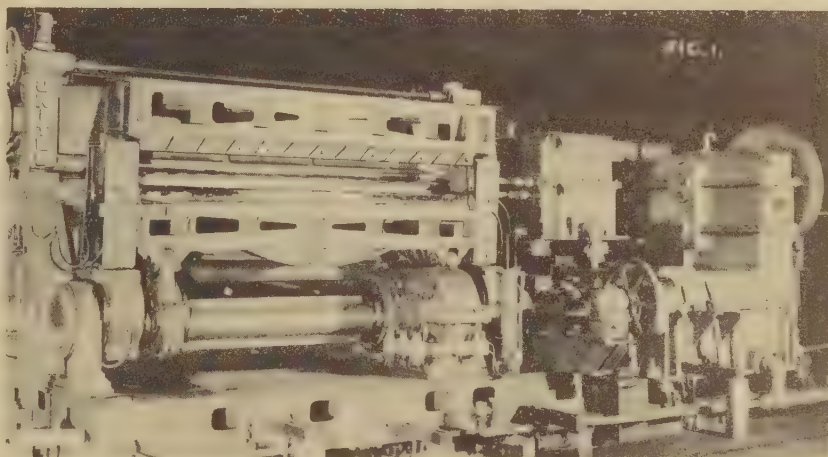


FIG. 10 - This inspection setup in a General Flexible Power Press checks the axle for straightness. The press is operated by a screw and clutch from a pedal to bend the axle slightly if the welded assembly is not quite straight.

found, they are corrected by bending through the use of the screw-operated ram whose advance is controlled by a clutch that is engaged and disengaged by a pedal. The gage, of course, shows how much deviation from straightness exists and the operator uses judgment in applying pressure gradually until the bending load corrects the alignment.

Guillotine Shear for Sheet



A NEW principle in sheet shearing has been incorporated into the new Talbot type flying sheet shear, designed for shearing aluminum, steel, brass, copper or other metallic sheet and strip material. It is basically a guillotine shear. The Talbot shear, developed by United Engineering and Foundry Co., differs from other guillotine flying shears principally in the conception of its knife path motion.

The unit shown in fig. 1 is designed to cut aluminum alloy from 0.025 to 0.125 in. thick in widths up to 106 in. and into lengths varying from 30 in. to 36 ft. It has a maximum line speed of 300 fpm.

Three smaller shears of the Talbot type are under construction and will duplicate that shown

in fig. 1 in every respect except that they will be upcut action, and will have capacity to cut 48 to 60 in. wide low carbon and stainless steel strip in gages up to 0.090 in. The unit can be built for usual sheet mill gages and widths to operate at speeds up to 600 to 700 fpm.

The Talbot motion employs the bottom knife pitmans mounted on eccentrics integral with a plant pinion sleeve bushed on the main crank eccentric and driven by a planet ring gear. This ring gear is in timed relationship to the top knife main shear frame which is in turn eccentrically mounted on the main crank shaft. Speed synchronization is by a remotely operated adjustable lever on the rocker shaft and by a separate eccentric on main crank shaft.

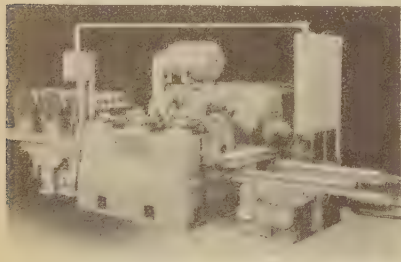
New Production Ideas . . .

New and improved methods and equipment described this week include: Cylinder block facing, cold nut forming, torsion testing, metal cutting units, a foundry rotor-ladle, a welding control and a stabilizer, a high frequency transformer, a phase sequence indicator, portable drills, impact wrenches, snap nuts and several shop maintenance items.

Cylinder Block Facing

TWIN problems of adequate production and accuracy in facing cylinder block assemblies are claimed to have been solved by *Cross & Co.*, Detroit 7, who have announced a special machine designed to finish the transmission point face square with the crankshaft bore at a rate of 56 per hr. Parts are handled in multiples by a transfer mechanism and three blocks are faced at the same time with one operator. Blocks slide in and out of the machine on a conveyor with the help of automatic power transfer mechanism. Locating and clamping are automatic. Single point carbide facing tools are employed. Hydraulic valves are gasket mounted. Known as the Transfer-matic, this machine can be expanded to include other operations. Machines can be added for precision boring the locating holes of the transmis-

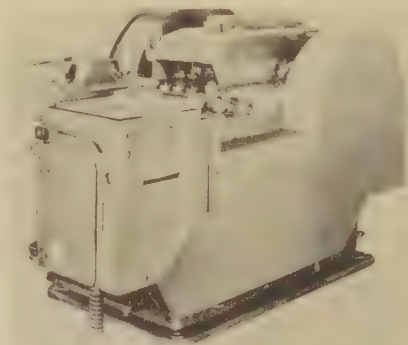
sion, hug lock nuts, Marsden lock nuts, and jam nuts can be produced on these machines. Similar to a transfer header in design, the cold nut former utilizes a principle of operation whereby only a minimum of cold forging is done on the blanks until the later operations, so that the finished blanks have typical forging strength and toughness. Machine features include a short rigid bed frame, patented overarm heading slide, automatic lubrication, and a four station transfer mechanism that turns the nut blanks 180° after each stroke.



sion, or finish-facing the crankshaft thrust faces. The transfer mechanism is then lengthened by incorporating standard units to accommodate the change.

Cold Nut Formers

COLD nut formers that produce a variety of hex nut blanks are being manufactured by *National Machinery Co.*, Tiffin, Ohio. Standard single and double chamfered nuts, washer faced nuts, castellated



All operations—gathering, blanking, forming, and punching—are simultaneous and the machine produces a complete nut on each stroke. Blanks produced are said to be accurate, holes are concentric, and the blanks have a fine finish. Scrap loss is held to between 10 and 15 pct. The machines are built in 5/16, 3/8, 1/2, 5/8, 3/4, and 1 in. sizes. Outputs range from 100 nuts per min on the smallest machine to 40 per min on the 1 in. size.

Torsion Machine

A NEW type torsion machine developed by *Baldwin Locomotive Works*, Philadelphia 42, tests axle shafts, crankshafts, frame and

body members of buses and trucks that are subjected to torsional stresses in service. The machine has a maximum capacity of 1,000,000 in-lb and is large enough to test bars or tubes up to 10 ft long and 6 in. diam. It consists of a rigid base frame, a drive head at



one end and a weighing head that travels on two racks and tracks on the base frame and can be clamped to the base at any desired position. The weighing head measures torsional loads in either direction of rotation. The drive head is powered by an electronically controlled, variable speed, dc motor with a 20 to 1 speed range. Four load ranges are available for torsional tests: 10,000; 50,000; 200,000; and 1,000,000 in-lb.

Band Saws

FOR small manufacturers fabricating sheet metal, plastics and other materials, a series of general purpose band saws permit conversion to handle any sawing operation by the addition of accessories. The basic machine, Model HS, has one high set-speed or two 4-speed step pulley drive for cutting plastics, wood and similar materials. Model HSV has variable high speed range of 850-5200 fpm for fast cutting of aluminum, sheet steel and light structural forms. Model LHV has both high and low variable

speeds of 50-300 fpm and 850-5200 fpm. It is recommended for cutting ferrous and nonferrous metals and alloys. Model SFP has same speed range as Model LHV but includes equipment for filing and polishing operations as well as welding of saw bands. Power choice is $\frac{1}{2}$ or $\frac{3}{4}$ hp. This line is offered by *DoAll Co.*, Des Plaines, Ill.

Bench Grinder

A PRECISION 6-in. utility bench grinder with dynamically balanced enclosed motor of the permanent split capacitor type has been announced by *K.O. Lee Co.*, Aberdeen, S. Dak. The motor is claimed to stand severe usage without break-down or burn-out. Standard equipment includes 2 grinding wheels, fine and course, adjustable tool rests and an abrasive wheel dresser.

Drill Holder

A NEW short series holder for standard core drill cutters, announced by *Eclipse Counterbore Co.*, 1600 Bonner St., Ferndale, Mich., is manufactured in $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$ and 2 in. sizes, taking cutters ranging from $1\frac{1}{2}$ to 3 in. The new holders designed for relatively shallow hole operations in turret lathes, can be used for similar operations in drilling machines. The body of the stub holder is without flutes and approximately one-half the length of the conventional fluted types.

Cut-Off Machine

A 55-lb light duty abrasive cut-off machine said to be 85 pct faster than a power saw, cuts alu-



minum, tool steel, tubing, pipe and other materials. Built by *Approved Devices Co.*, 525 Woodward Ave., Detroit 25, this portable machine is

equipped with a $\frac{1}{3}$ -hp motor for operation on 110v, 60 cycle ac single phase current. A special attachment is available for angle cutting.

Welding Control

NEW built-in features have been incorporated in the latest model non-synchronous control combination for foot-operated spot, projection, and butt welders, developed by *Weltronic Co.*, 19466 W. Eight Mile Rd., Detroit 19. This Series K provides simplified installation by combining the main line disconnect switch within the unit, so that power lines may be



brought in directly. Available in floor, side-of-welder, or wall-mounting styles, the cabinet houses a NEMA 1A, 3B, or 5B timer, fusible or non-fusible disconnect switch, line fuses, and an ignitron contactor. The timer panel is the plug-in, swing-out type, permitting interchanging 3B and 5B timers in less than 1 min. Each time period is independently adjustable.

Cutting Shear

A LMOST any odd shape can be placed over the head or under the base of a new, high speed, low cost shear called the Grampus, for quick, efficient and burr-face cutting. The Grampus, announced by *Federal Machinery Co.*, 134 Grand St., New York, does fast inside cutting, both straight and contour, by means of a simple locking device. No starting hole is required for inside work. Rated for up to 14 gage mild steel, there is finger tip con-

trol of the stroke, and rapid adjustment of the cutting blades for very light material. Pipe work, pans, channels, tubes, shells, etc., of various diameters and depths,



within the limits of its 7-in. throat can be handled. The unit is rugged for heavy duty, but compact, and weighs 100 lb including its $\frac{1}{4}$ hp motor.

Multi-Purpose Face Plate

A LATHE can be converted into a milling machine, a boring machine, or a drill press, with a multi-purpose face plate and attachments announced by *Superior Mfg. Co.*, 1302 Ontario St., Cleveland 13. Regular or odd shapes and sizes can be handled. Bar stock or castings can be drilled, bored, milled, or ground. Operations at any radial or angular relation to each other can be performed without moving the work from its original position in a fixture. In addition to the face plate and adapter, the attachments consist of a vertical V block, an auxiliary T slot face plate, a three jaw chuck, an angle plate, and a horizontal V block with clamp. It is said the average machine operator can make the changes required for different types of work.

Metal Cutting Electrode

MANUFACTURE of a smaller diameter metal-cutting electrode for cutting thin sheet metals has been announced by *Eutectic Welding Alloys Corp.*, 40 Worth St., New York 13. This $\frac{3}{32}$ -in. diam electrode called Cuttrode which has been developed for stainless, bronze, nickel and copper cutting, is recommended for small ac welding machines. Electrodes of this series for cutting cast iron, stainless, bronze, aluminum and metals are also available in sizes $\frac{1}{8}$ in. for medium thick cutting, $\frac{3}{16}$ in. for chamfering and cutting heavy cast iron and $\frac{1}{4}$ in. for heavy parts.

Foundry Rotor-Ladle

TO transport molten metal from cupola to pouring floor and to pour molten metal without removing the ladle from the truck, a new rotor-ladle attachment for



foundry fork trucks has been developed by *Yale & Towne*, 4530 Tacony St., Philadelphia 24. A 360° rotor has two speeds, the slower speed giving added control when pouring the metal. In operation the ladle is picked up by means of forks, lifted to desired pouring height, and rotated to pour as desired. The truck is an end control fork model of 54-in. wheel base, 83-in. mast height, and 45-in. overall width. Speed of the truck is 4 miles per hr under full load. The mast tilts 20° to center the load. The 4150-lb capacity ladle is 34½ in. diam x 39 in. high. The rotating device can be removed and standard forks installed on the truck for regular metal industry uses.

High Frequency Stabilizer

FOR use with ac or dc welders in inert-gas-shielded tungsten electrode welding, in sheet metal work, in vertical and overhead welding, and with the twin carbon arc torch, a high frequency stabilizer has been designed by *Hobart Bros. Co.*, Troy, Ohio. It adapts ordinary ac transformer welders for Heliarc welding, increasing the impulses from 120 per sec to 4,000,000 per sec. The intensity of the high frequency can be adjusted to suit the particular job at hand. It is available in two sizes with maximum capacities of 300 to 500 amp.

Gears and Crane Wheels

A NEW line of armored gears and crane wheels for steel mills, coal mines, and industrial plants, where there is need for gears that can withstand more than ordinary shock and wear, has been announced by *Pittsburgh Gear Co.*, Pittsburgh 22. Advantages of these

gears, that are of the company's own laboratory specification steel and special armoring process, include an average service life 5 times that of untreated gears, 1 to 1½ times that of oil treated ones, and equal to the average life of other heat treated gears in identical service.

Phase Sequence Indicator

DESIGNED for a wide range of applications in the manufacturing, industrial and central station fields, a new phase-sequence indicator announced by *General Electric Co.*, Schenectady 5, is entirely static with no moving parts, bearings, or pivots. This indicator is applicable to either 120, 240, or 480-v circuits at 25, 50, and 60 cycles. One use of the indicator is to predict directional rotation of polyphase meters for machine drives and similar equipment. Another is to determine proper con-



nections for paralleling generators, transformer banks, and power buses. It is also used to determine proper connections for watt-hour meters, reactive-component meters, power-factor meters, kva meters, reverse-power relays, and phase sequence relays. The instrument may also be employed to check vacuum-tube, thyatron, rectifier and inverter installations and to study vector relations of polyphase circuits.

Portable Drills

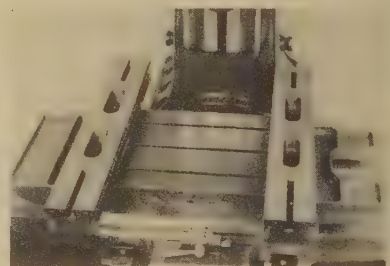
EIGHT portable electric drills including models from a ¼-in. light weight type to a heavy duty ⅞-in. unit and which are equipped with K-O keyless drill chucks, are now available. Made by *K.O. Lee Co.*, Aberdeen, S. Dak., the company reports the models have been introduced to meet the demand for portable drills with the K-O keyless chucks as original equipment.

High-Current Transformer

A PORTABLE current transformer in the high current range which is announced as more precise than any previously built, is now manufactured by *Westinghouse Electric Corp.*, 306 4th Ave., Pittsburgh 30. Based on a new principle in current-transformer design, error-causing effects of stray magnetic fields from the same or other circuits are claimed to be eliminated. The transformer is said to have an accuracy of ±0.1 pct and five minutes phase angle over the range of current from 10 to 150 pct at burdens up to 0.5 ohms. Eight current ratings from 1000 through 4000 amp to 5 amp are provided. High accuracy is said to be accomplished by passing primary current through the windings in the usual manner and then fanning out the primary conductor into a copper shell and bending it back in a U turn, completely surrounding the windings.

Extension Parallels

EXTENSION parallels, for use with jig borers and jig grinders to increase effective table size, have been announced by *Moore Special Tool Co.*, 750 Union Ave.,

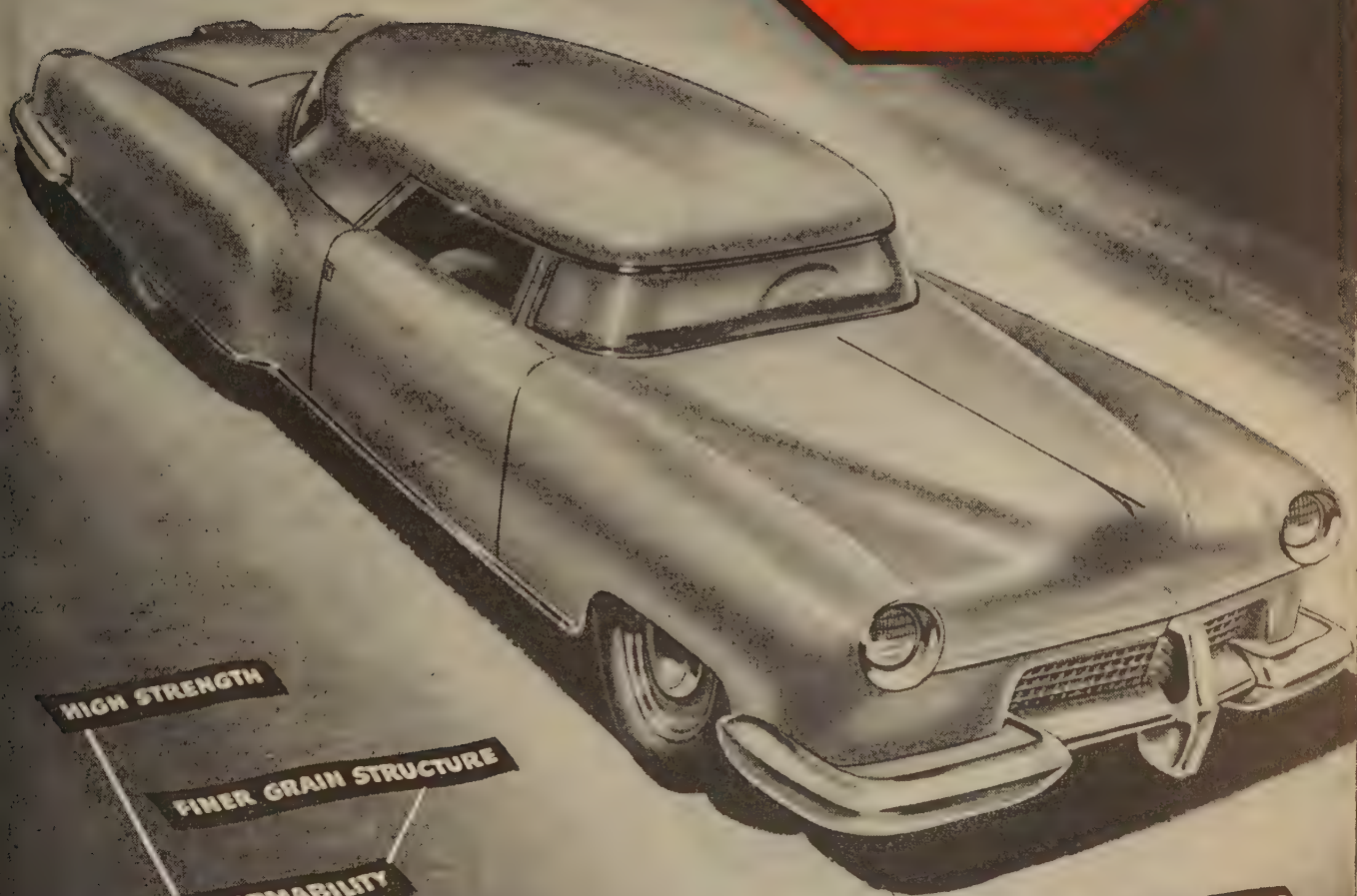


Bridgeport 7, Conn. Furnished in sets of four, they will accommodate work almost twice table size with no loss in accuracy of table settings, it is said. With extension parallels the jig grinder and Models 1 and 2 jig borer can accommodate work 5-in. larger than table size in both directions, or work 10 in. larger in only one direction. The 10-in. rotary table for circular parts, used with all three machine tools, can be increased to accommodate rings more than 20 in. diam. Parallels are 10 in. long by 3 in. wide by 2 in. thick and made of close-grained Meehanite.

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• GM makes sweeping changes in its executive staff . . . Additional announcements may come from Murray Bay conference . . . Continental develops new air cooled power plant for the Army.



DETROIT — Rugged individualism still pays off—in General Motors.

This is one interpretation of the recent series of top staff changes which has the entire corporation jittery at the moment when GM executives go into super executive session at Murray Bay, Quebec, for their first general conference since the war.

Naming of Harlow H. Curtice, general manager of Buick Motor Div. as executive vice-president is the best example of GM's preference for rugged individualists and individual thinkers. Mr. Curtice has never been much of a follower. When he took over Buick in 1933 the company was in the doldrums, hav-



H. H. Curtice

ing slipped to eighth place in the industry. By 1938 "Red" Curtice had pushed Buick up to fourth place. He has kept the company there ever since—but not without

having his individualism tried rather severely.

Several examples come to mind. Several years ago Buick made a surprise move away from the central GM research work on automatic transmissions. Eventually, the company came out with its present dynamatic models. This move by Buick was made at a time, it will be recalled, when the hydramatic transmission was already adopted by two GM divisions, Oldsmobile and Cadillac. It was thoroughly tested in the field. Nevertheless, Mr. Curtice went his own independent way about transmissions for Buick—which now seems to be paying off.

Probably the best example of Mr. Curtice's individualism occurred last year when he pulled Buick out of the GM "C" body pool to continue production of the present pre-war models. At the time, this was regarded as rank heresy and some GM folks were beginning to ask, "Is Buick still in the corporation?"

As events have now turned out Buick is decidedly still in the corporation—with Mr. Curtice now elevated to the position of executive vice-president of GM and William



W. F. Hufstader

F. Hufstader, general sales manager of the Buick Div., elevated to the vice-presidency of GM in charge of the distribution staff. He succeeds W. G. Lewellen whose resignation to go into private business has come as a distinct surprise to his many friends here in Detroit.

There has been some speculation here as to whether or not Mr. Curtice's promotion has placed him in the most logical position to succeed C. E. Wilson as president of GM. Some enthusiasts here were so sure of this they had Mr. Wilson resigning or moving up shortly to chairman of the board to make room for Mr. Curtice. This appears to be premature although it cannot be

ruled out as a possibility. A more realistic interpretation seems to be that Mr. Curtice is in a very favorable—but not necessarily the most favorable position—to succeed Mr. Wilson when, and if Mr. Wilson retires or becomes board chairman.

AS executive vice-president, Mr. Curtice will be in charge of all GM staff activities as distinguished from operating activities. Under his direction will be distribution, styling, central engineering, research, personnel, employee relations, public relations, business research, procurement and schedules and facilities and processes. M. E. Coyle will continue in charge of the car and truck group body and assembly divisions group and the accessory group. O. K. Hunt, executive vice-president, will be in charge of all other operating divisions, including the engine group, the Dayton and household appliance group, and the overseas and Canadian group.

While the public will probably hear much more in the future about Mr. Curtice than about the other GM heads, it is well to remember that as long as each individual GM division has its autonomy—a fact that has been demonstrated most ably by Mr. Curtice himself—it is always possible to place too much weight on the pronouncements of the Detroit central office insofar as engineering, processing and styling is concerned. In matters of employee relations, of course, the corporation policy is naturally controlled in Detroit under an industry-wide contract with the UAW-CIO.

Mr. Curtice entered the automotive industry in May 1914 as an accountant for AC Spark Plug Co. At 21 he was comptroller of AC, the youngest executive in the industry. In 1929 he was named president of AC. After AC became a General Motors division, Mr. Curtice became Buick's general manager.

Last week Buick turned out its 5 millionth passenger car. About half of these cars have been built under Mr. Curtice's direction. Du-

How to pick safe speeds for carbide burs: use the half-million trick!

If your carbide burs chip their flutes, you probably are using the wrong driving speed. Here is a simple, easy way to cure it.

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All you do is divide the number of flutes into half a million to find the *minimum* recommended speed in R.P.M. Just glance at the flute number on the shank, do one easy division, and you *know* the speed you must stay above to avoid flute chipping. Simple, isn't it?



All P&W Keller Carbide Burs are "center fluted". That means they have the same number of flutes over the whole bur length, regardless of its shape. Each flute is *machine ground* from the solid . . . a precision job.

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tools for the job"

ing Mr. Curtice's administration Buick facilities have been greatly expanded and modernized. Meanwhile, production was boosted from 43,000 cars in 1933 to 377,000 cars during the 1941 model year. During the war Buick made more than 30 different items of military equipment including Pratt & Whitney engines, "hellcat" tank destroyers, M-4 and M-10 tank power trains, antiaircraft gun mount mechanisms and other products.



Ivan L. Wiles

Ivan L. Wiles, now divisional comptroller of Buick Motor Div., will succeed Mr. Curtice as general manager of that division. He has been elected a vice-president by the GM board of directors.

ANOTHER significant change in the GM top executive setup was the election of John J. Cronin as general manager of Fisher Body Div., succeeding L. C. Goad, who has been placed in charge of the body and assembly divisions group of General Motors, succeeding Thomas P. Archer, vice-president, who is on a disability leave of absence. At 46, Mr. Goad is the youngest top executive in General Motors. His rise in the corporation has been meteoric.

Joining Delco-Remy in 1923 he later went to AC Spark Plug Div. at Flint, becoming general manufacturing manager in 1934, and general manager in 1938. He came to Detroit in 1940 and a year later was appointed assistant to Albert Bradley, now executive vice-president. He headed the Eastern Aircraft Div. of General Motors during the war, and was appointed



L. C. Goad

general manager of Buick-Oldsmobile-Pontiac Div. in 1945. He became general manager of Fisher Body Div. in September 1946, and is a member of both the Operations Policy Committee and the Administration Committee. Many observers here see Mr.

Goad's star rising faster than that of any other young executive on the General Motors' staff.

Of particular interest to the metalworking industry is the appointment of Rodger J. Emmert, factory manager of the GMC Truck & Coach Div. to head the facilities and processing staff. Roger M. Kyes, will be in charge of a procurement and schedules staff. These duties were formerly under the supervision of W. F. Armstrong, who has recently been named general manager of Chevrolet Div.

Mr. Emmert will be in charge of the important production engineering and process development sections of GM. His other duties include development of standards and direction of the power section. Mr. Emmert was formerly factory manager and later president and general manager of Delco Products Corp. In 1933 he became factory manager of Yellow Truck & Coach Div. of General Motors.

Roger M. Kyes who heads the procurement and schedules staff joined General Motors in August 1948 after serving as president and general manager of Harry Ferguson, Inc. He was formerly associated with Glenn L. Martin Co., Black & Decker Mfg. Co. and Empire Plow Co.

Another important change in the GM staff was the appointment of Stephen M. DuBrul to head a newly-created business research staff. The new section absorbs the earlier Social and Economics Relations Section which is being discontinued.

* * *

AUTOMOTIVE engineers who interred the air cooled engine with the Franklin car will undoubtedly be forced to reconsider their position as a result of recent developments in air cooled power plants by Continental Motors Corp.

This week Continental displayed for the first time its six models ranging from 125 to 1040 hp. Developed for a wide range of uses in the military the new engines offer many advantages, including simplicity of design, suitability for mass production, lightness and compactness. The military is expected to use the new engines for tanks and many kinds of front line mobile equipment where their excellent payload ratio is of great importance.

Continental began work on the

new engines nearly 5 years ago, is disclosed, following a recommendation of the Ordnance-Industry Advisory Committee that an air cooled engine of 650 hp minimum be undertaken.

The inherent advantage of a standard line of military engines is seen in the disclosure that during World War II six different engines were used in medium tanks alone requiring six sets of tools, six groups of trained mechanics and 5165 different spare parts. With its new standard engine, the Army expects its engine parts requirements for medium tanks will be cut to 954.

Development of the new engine has been under the direction of Carl F. Bachle and Edward A. Herbert.

SINCE the new engines do not require radiators, water pumps and other accessories used on liquid-cooled engines, the weight saving is substantial. Continental engineers say the new power plants save about two thirds of the weight of the old liquid-cooled power units. For example, a 250 hp Continental engine weighs 777 lb compared with 2400 lb for a liquid-cooled engine of corresponding power. When operated in a vertical position the new engines occupy only a little more space than the radiator and fan of a liquid cooled engine.

The new air cooled engines use only two basic cylinders of 4 $\frac{5}{8}$ and 5 $\frac{3}{4}$ in. diam. Power is increased merely by adding to the number of cylinders and stepping up the compression ratio. Smaller engines to 250 hp are 4, 6 and 8 cylinder horizontally-opposed models. Using the larger cylinders, v-type arrangement and superchargers, the power is pushed up to a maximum of 1040 hp.

Compression ratio models range from 16 to 1. Supercharged is 6.5 to 1. Cylinders are made of SAE 4140 aluminum fins are used as in aircraft engines to increase cooling. Piston pins are SAE 3312, carbide. Since many machining operations specified to cut down weight in aircraft engines are not required for ground vehicle weight of the engine is about 100 lb per hp. Air cooled engines can be built in production for about the same cost as a conventional liquid-cooled unit of the same capacity.

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OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

• Excise tax structure due for overhauling . . . Key congressmen see gradual shift to general manufacturers' excise tax on almost all products . . . some reductions are due.



WASHINGTON—One of the most important problems to be taken up by the 81st Congress next January is that of making changes in the nation's excise tax structure.

Generally speaking, the program for excise tax legislation in both the Senate and House next year can be summed up this way: (1) Eliminate some taxes, (2) reduce others, and (3) broaden the base to make up for the lost revenue. These are the present plans of majority leaders on both sides of Capitol Hill.

The long-range view to support this program is this: Many legislators feel that the federal government has for some years been drifting into the error of relying too heavily on the revenue derived from income taxes.

Until recently, excise taxes had never been an important source of revenue. They were applied in good times and taken off in poor times and always have resulted in floods of protests from both retailers and consumers.

The trend which now is gaining more and more favor both on Capitol Hill and in the executive branch of the federal government

is that excise taxes should be increased in number and shifted to the manufacturing level.

Here these taxes would become a permanent part of the nation's tax structure. And, over a period of years, excises would be applied to more and more products and commodities, so that eventually an excise tax would be levied on almost every article produced in the United States.

An old adage among congressmen serving on the two revenue committees of Congress is that collecting taxes is like plucking a goose—"you want to get the most feathers with the fewest squawks."

As every businessman realizes, the problem if tax reduction is directly related to the problem of reduced federal expenditures. Taxes cannot be cut until the cost of running the Federal Government can be cut.

If business continues to be good and incomes remain high, the Treasury Dept. will reap a large return from income taxes and the so-called luxury taxes. But if the level of business activity takes an unexpected drop, most or all of the excises now in effect may have to be retained for the revenue they will bring in to the federal coffers.

CONGRESS feels that if all or most of the excise taxes are ultimately levied and collected at the manufacturing level, the consumer will not squawk too loudly. Taxes would be paid by the manufacturers and the feeling on Capitol Hill is that most consumers would be unaware that the selling price of an article includes a "hidden" levy tacked on at the manufacturing level.

A further argument for broadening the base of the federal tax structure to include permanent manufacturers' excise taxes as well as income taxes is that the job of balancing the budget would become simpler. The national revenue, it is argued, would over a period of years tend to become less sensitive to the ups and downs in total amounts of revenue collected

under the present tax structure which is based principally on the income tax.

Proponents of the manufacturers' tax say that consumers always buy each year a certain minimum of goods and services. People will naturally buy less in bad times than in good years, but certain cost-of-living items like clothing, furniture and certain household appliances are always in demand.

A more or less steady and constant flow of revenue into the federal treasury should therefore aid in achieving greater national financial stability and should make the balancing of the national budget get an easier and more predictable task.

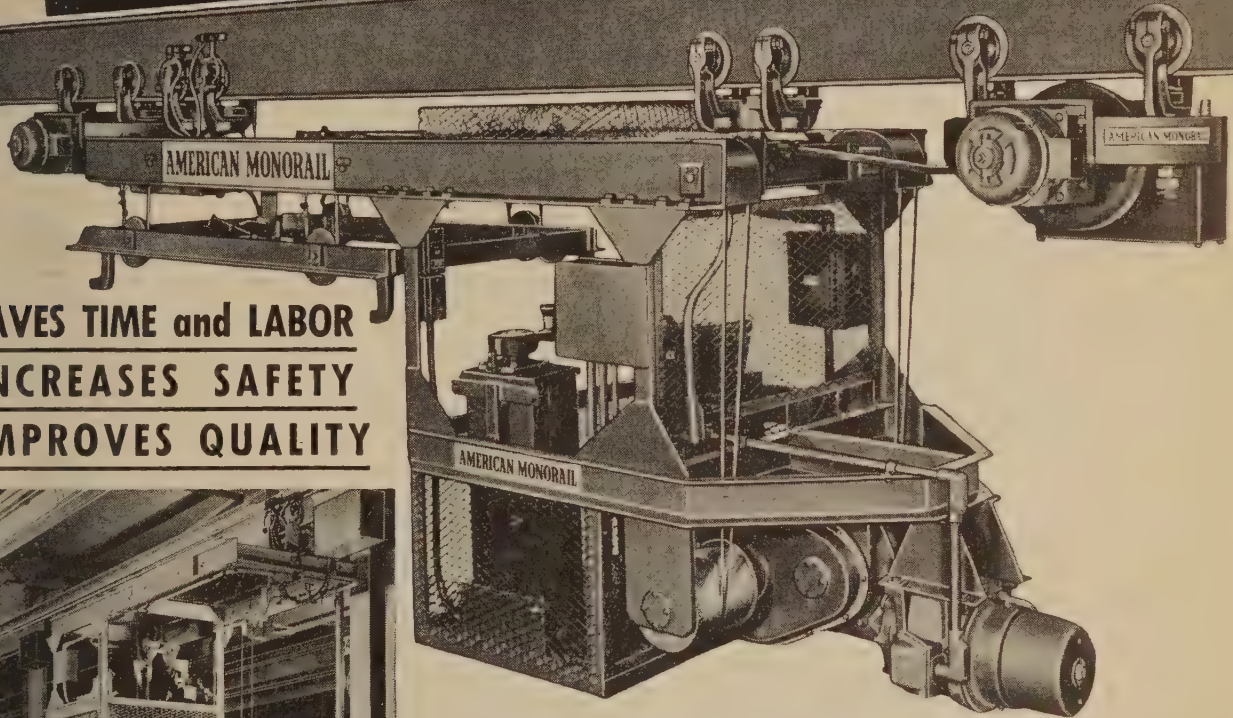
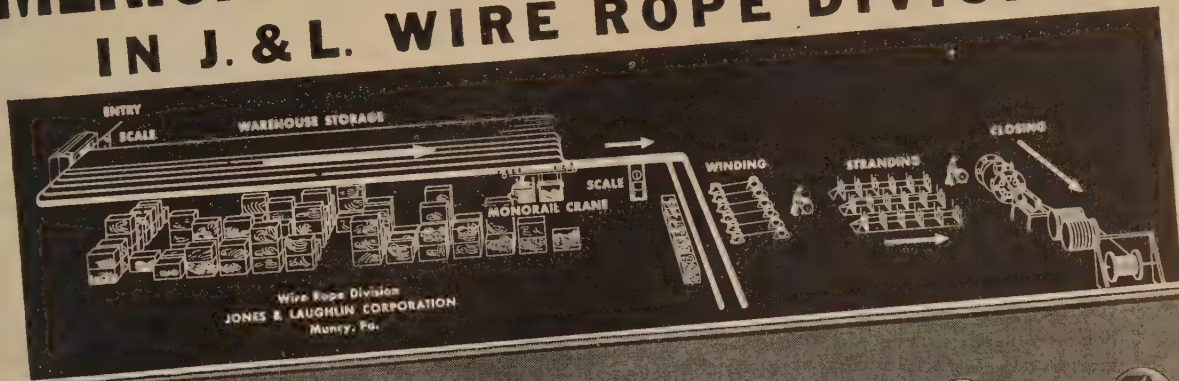
Both Representative Knutson, Republican, of Minnesota, chairman of the House Ways and Means Committee, and Senator Milliken, Republican, of Colorado, chairman of the Senate Finance Committee, agree that the next tax relief to be granted by Congress will be in the field of excise taxes.

BUT they warn that any cuts will be small, and that cuts will be made only if the budget for fiscal 1950 will permit reductions. And they insist that any forthcoming reductions will be selective in nature, and will not be in the nature of general excise reductions.

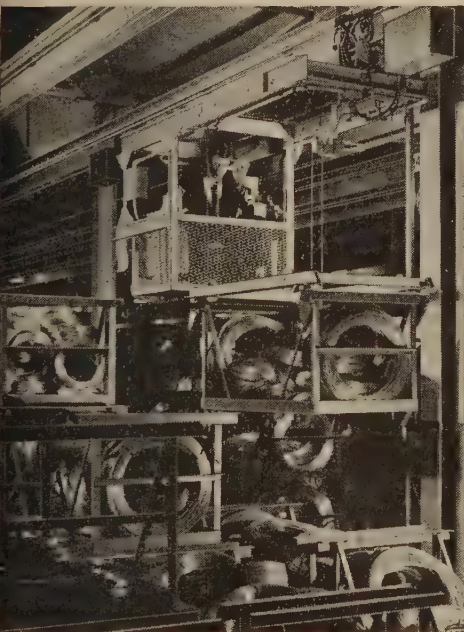
It appears almost certain that the chief sources of the federal government's annual \$7.5 billion revenue from excise taxes will be retained—at least for the foreseeable future. Therefore, little or no tax relief can be predicted for such products as liquor, tobacco, automobiles and automotive parts, gasoline, firearms, refrigerators, radios and the like.

In other fields, some tax relief seems more likely for 1949. For such commodities as jewelry, fur, toilet preparations, luggage, handbags, and wallets there may be exemptions granted for the lower priced articles. Excises on transportation, business machines, tele-

AMERICAN MONOTRACTOR CARRIER IN J. & L. WIRE ROPE DIVISION



SAVES TIME and LABOR
INCREASES SAFETY
IMPROVES QUALITY



Operator of MonoTractor Carrier can deposit or select racks of wire at any spot in the warehouse.

A recently installed American MonoRail Overhead Handling System at the Wire Rope Division of Jones & Laughlin Steel Corporation not only saves time and labor, but also increases safety and improves quality of production.

All manual lifting of coils has been eliminated. Coils loaded in special racks are stacked three tiers high in the warehouse. Operator of MonoTractor Carrier has access to all racks for quick transfer of coils to the winding reels. Labor requirements for materials handling has been substantially reduced. Injuries from lifting have been almost eliminated. Stoppage caused by wire kinks and other damage when handled manually have been reduced by overhead handling.

Let an American MonoRail Engineer show you that automatic handling pays and saves.

THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVENUE

CLEVELAND 7, OHIO

phone, telegraph and wire services may be next in line for reduction.

Tax officials estimate that the federal government now derives about \$100 million annually from excises on jewelry. Another \$50 million is collected annually from sales of toilet preparations, and about the same amount is collected in revenues assessed against luggage and leather goods sales.

Therefore, Congress will weigh this prospective loss of revenue carefully before voting even modest reductions in excises. It is up to businessmen to point out to Congress that lower taxes generally encourage investment, capital expansion, and the level of business activity.

Chairman Knutson summarizes the tax outlook in this way:

"Our federal internal revenue system must be based on a well-balanced tax system. It should not be confined to the income tax, or to the income tax and excise taxes on liquor, tobacco, and beer alone. To do so will seriously cripple the federal revenues and throw the entire burden of supporting the activities of the federal government upon a few, chiefly those paying the income tax. The income tax

does not reach the man living on his capital or the man deriving his income from tax-exempt securities.

"Furthermore, the income tax is one of our most unstable sources of revenue. In times of active business, when capital is gainfully employed and profits are large, the government collects large revenue from the income tax. When industry and commerce slow down, capital ceases to work, profits disappear, and the income of many individuals vanishes as well as our taxes.

"This is why the income tax fails to produce revenue in periods of decline, as is shown by the experience in 1932 when we had to impose additional excise taxes to head off a deficit because the revenue from the income tax had declined to such an extent that it was insufficient to meet the costs of government.

"To depend too much upon such a tax will place an intolerable burden upon the active American businessman, the man with a salary, and the successful professional man, thus preventing business expansion and production as well as individual incentive."

Antitrust Suits Filed Against Farm Machinery Makers by Government

Washington

••• Civil antitrust suits have been filed in the United States District Court for the District of Minnesota charging three of the largest manufacturers of farm machinery in the country with violations of the Sherman and Clayton Acts.

The cases are against International Harvester Co., J. I. Case Co. and Deere & Co., and nine of its subsidiary companies as defendants. Each is charged with suppressing competition by agreements with retail dealers which prevent competing manufacturers of farm machinery from using those market outlets.

"One of the most serious effects of these exclusive arrangements is to limit the range of selection which farmers might otherwise have in the purchase of farm machinery. The chief purpose of these suits is to cancel the restrictive arrangements and open up the market on a competitive basis for the benefit of farmers, competing manufacturers and dealers alike," Attorney General Tom C. Clark stated.

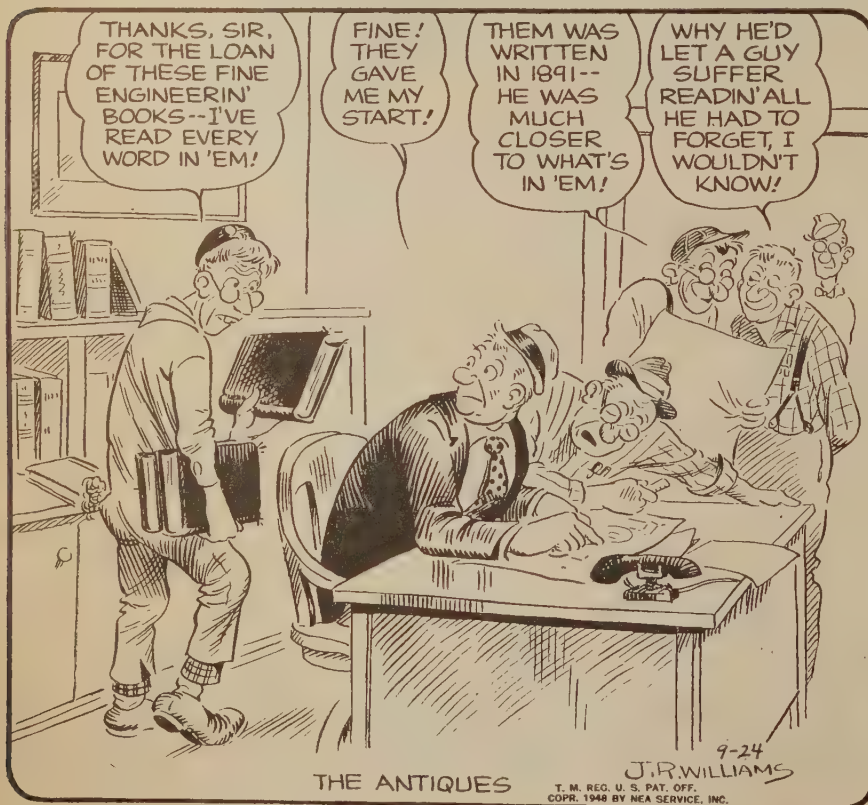
Herbert A. Bergson, assistant attorney general in charge of the Antitrust Div., said: "The average farming community can support only one or two farm machinery dealers. Naturally, these dealers must be able to supply their customers with a full line of equipment. If they are required to deal with a single company, they must deal with a full line manufacturer."

"A necessary consequence of such a requirement is not only to restrict the farmer's choice but also to deny to other manufacturers and particularly 'short-line' manufacturers, the opportunity to increase their share of the available business even though they may produce a more efficient and less costly machine.

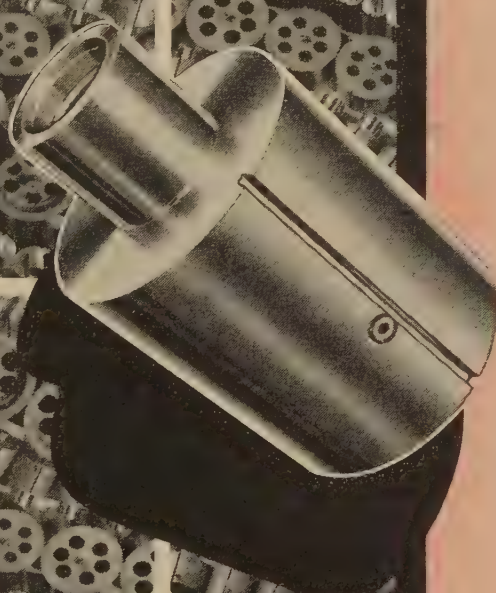
"These cases are designed to restore competition in this industry and thereby enable manufacturers of competing lines of farm machinery to procure a substantial number of additional market outlets."

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Thousands of 'em!



Thousands of Precisionaire standard semi-finished gaging plugs are carried in stock for quick delivery.

Shipments made within one week from receipt of complete information—24 to 48 hours in emergencies.

This world's largest stock of "immediately available" air gage tooling protects Precisionaire users against production holdups or shutdowns.

Sheffield's interest does not diminish with the purchase of a Precisionaire. The instrument must be kept constantly useful. Quick tooling service from this great stock assures you uninterrupted performance throughout the long life of the instrument.

It is wise and thrifty to specify Sheffield.

5009

Sheffield's principal products include Gages, Measuring Instruments, Machine Tools, Threading Tools and Contract Services. Standard Gages shipped within 24 hours.

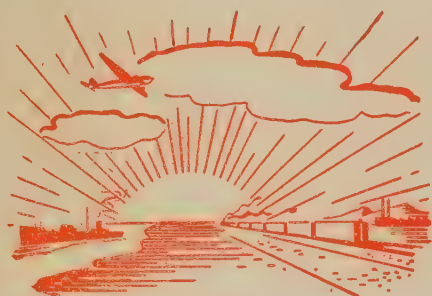
the Sheffield

Corporation

DAYTON 1, OHIO, U.S.A.



• Pacific Coast Industry united behind non-Communist prerequisites for collective bargaining . . . F.O.B. sales system has fabricators in confusion . . . Geneva Steel feels tax law needs clarification or amendment.



SAN FRANCISCO—Several hundred thousand workers in industry and transportation are bitterly lined up this week against organized employers and large scale industrialists on the West Coast in a fundamental test over the non-Communist pledge under the Taft-Hartley law. Except for the port of Tacoma, organized by the comparatively contractable AFL, and a single stevedoring company at Seattle which has broken away from the coastwise waterfront employers' organization and separately contracted with the striking CIO, every port and every dock on the West Coast is idle.

The Army has been stopped or severely slowed down in its attempt to sign up stevedores and longshoremen directly, bypassing the union's sacred hiring hall and threatens to use troops and civil service workers to assure a flow of supplies to the Pacific islands and garrisons and construction projects. The employers refuse to bargain with any union whose leaders will not sign the Taft-Hartley non-Communist affidavit.

Similarly in the oil industry most principal refineries are down and there has been some violence when unpredictable IAM machinists passed through CIO massed

picket lines. Since bulk plants, truckers and service station operators are not on strike a reasonable supply of gasoline is available and the public has not yet suffered, except temporarily at certain points in southern California where previously most deliveries have been direct from refineries.

The issue in this major dispute was largely over wages and the bargainers were no further apart than 19¢ and 12½¢, but Communist influence and the Taft-Hartley pledge seem likely now to be conditions preceding any settlement. In fact this particular strike seems well on the way to having been lost in its third week.

A group of 40 or 50 representative industrialists of northern California meeting under the aegis of the State Chamber of Commerce one day last week agreed that their principal present problems revolve around three issues: This united stand to eliminate left wing leadership from unions through the Taft-Hartley pledge; corrective legislation of a single purpose type to prevent the wage and hour administration from upsetting collective bargaining through the overtime decision; and finally a thorough study and determination of the basing point decision to try to determine the final average comparative effect on West Coast industry.

Everyone agreed that confusion had become worse confounded in each of these three directions. C. M. Jorgensen, vice-president, Laher Spring & Tire Corp., Oakland, stated that steel basing point elimination would cost his firm from \$50,000 to \$75,000 per year. Laher purchases steel of many types from many sources and fabricates springs in Oakland.

THEIR principal customers are in southern California 400 miles away and they state that their freight cost on raw materials equals the freight charge which their West Coast customers pay for finished springs from eastern and midwestern plants, and that under competitive conditions they would be entirely barred from the south-

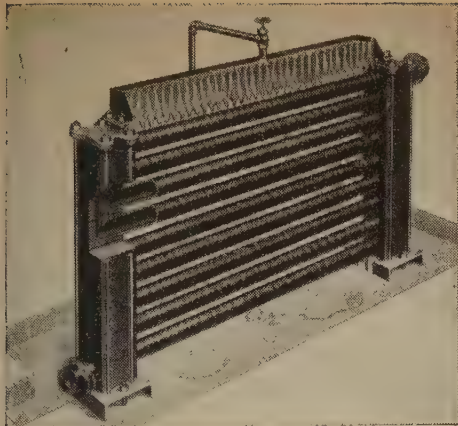
ern California market because of the presence there of a competitive spring manufacturer.

However, there are some students of the Supreme Court decision and of industrial and sales psychology who believe that under a free market neither the Robinson-Patman law nor the Supreme Court decision would prevent freight absorption to meet competition under these circumstances.

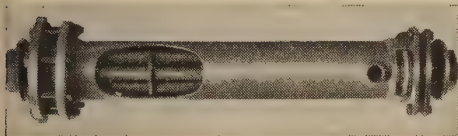
NOTE another major significant vote for the future industrial autonomy of the West Coast in the purchase of a 35 acre tract in Richmond, Calif. by U. S. Pipe & Foundry Co. for the later location of a plant for production of cast iron pressure centrifugal process pipe. This is a project that was dear to the heart of R. W. Martindale, this company's Pacific Coast manager for the past 20 years, and it is an ironic turn of fortune that the consummation of the development followed Bob Martindale's retirement by less than a year.

Where United States will get its pig iron is the big question. Apparently there is no understanding or commitment with either the Geneva Steel Co. or Columbia Steel Co. who control four out of five furnaces in Utah. Hitherto Pacific States Cast Iron Pipe Co. at Provo has been the only producer of pressure pipe west of the Rockies with annual production around 25,000 tons. This plant is closely integrated with the Provo furnace of the Geneva Steel Co. and modernization and expansion is now in progress. United States has been the largest sales factor on the West Coast for many years and the location of its plant on San Francisco Bay would not indicate that it plans eventually to tie in with any present West Coast blast furnace. Some economists figure that there might be a saving in shipping pig iron from the Birmingham area compared with shipping completed pipe, particularly in connection with rail hauls.

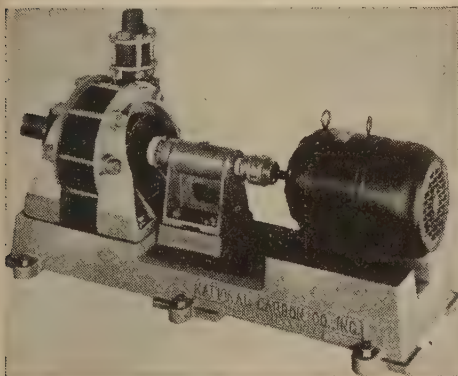
This is just another indication that both pig iron and scrap will continue scarce and short in the



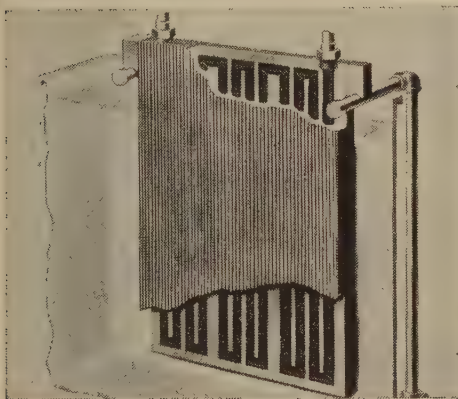
"Karbate" Sectional Cascade Cooler



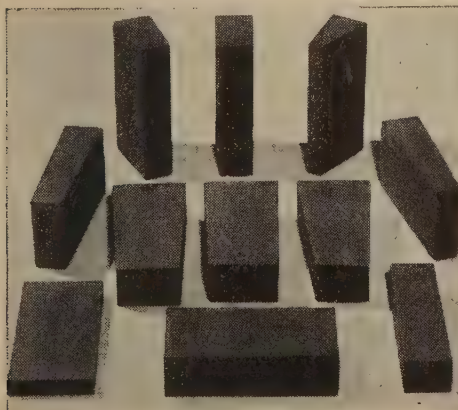
"Karbate" Series 70 Heat Exchanger



"Karbate" Pump



"Karbate" Plate Heater



Carbon Brick for Tank Lining

How to lick corrosion if you pickle or plate metal . . .

USE NATIONAL CARBON PRODUCTS

FOR HEATING, cooling, pumping, and conveying the corrosive solutions used in pickling and plating metal, there's no better equipment than that made of "Karbate" brand Impervious Graphite. This material is chemically inert, immune to thermal shock, easy to machine and install, light in weight yet strong; and has a very high heat-transfer rate.

Operating experience has proved that "Karbate" equipment stands up in sulphuric, hydrochloric, and nitric-hydrofluoric pickling solutions . . . Parkerizing and Bonderizing baths . . . nickel, copper, tin, and zinc plating solutions . . . electro-polishing and Alumilite and Alzak processes.

"National" carbon brick is now extensively used for lining tanks that handle corrosive solutions — particularly nitric-hydrofluoric.

For more details on metal-cleaning systems of standard "Karbate" brand Impervious Graphite units and "National" carbon brick, write to National Carbon Company, Inc., Dept. IA.

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The registered trade-marks "Karbate" and "National" distinguish products of
**NATIONAL CARBON
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New York, Pittsburgh, San Francisco



far west for far longer than it seemed originally possible.

Colorado Fuel & Iron Co. shipped 156,448 tons of merchant pig iron during the year ending Aug. 13 and this was a record. It went to 30 states and three foreign countries, El Salvadore, Guatemala, and Honduras. Incidentally CF&I broke all its previous records for coke production last month with 90,000 tons from its 262 ovens, the newest 72 of which were put into operation a year ago.

TWO chief executives of the U. S. Steel Corp. made significant observations in this neighborhood last week. E. G. Plowman, vice-president-traffic of the Delaware Corp., observed that the nationalization of all railroads is more than a remote possibility in an address before the Pacific Traffic Club. Since virtually all main railroad systems of the world outside of the United States are now nationalized and governmentally owned, Mr. Plowman cites this "growing hazard."

He further pointed out that four fundamental rights of shippers in American transportation would be threatened, viz: Freedom in selection of appropriate carrier and routing; right of shippers to use their own vehicles (trucks, barges, vessels, railway cars) when favorable; sharing to some extent savings resulting from efficiency in transportation of their own goods in lower freight rates; ability to take full advantage of the right of a new enterprise to go into the transportation business.

Imperative need for steel to build and expand long range transmission lines for natural gas, oil and water is responsible in large measure for steel dislocation on the Pacific Coast, according to F. B. DeLong, vice-president in charge of sales of the Columbia Steel Co. in a talk before the Pacific Coast Gas Assn. at Santa Cruz. He pointed out that the Pacific Coast has grown in population by 40 pct in 7 years and by 64 pct in manufacturing employment in the same period. Natural gas consumption has increased 56 pct in this same 7 year period and one long transmission line from Texas and New Mexico to southern California to help supply this demand took 100,000 tons of steel.

A comprehensive tabulation of

requirements for domestic gas transmission lines for the United States totaled 24,000 miles and required almost 5½ million tons of steel for its completion. Columbia Steel Co. on the West Coast was asked to contribute to a pool of steel plates to allow the construction of a new pipe line into Pittsburgh, and this contribution was made. Mr. DeLong further pointed out that the ingot capacity in the seven western states is 3½ times what it was in 1940 "and all running at capacity," producing a much larger proportion of the steel consumed in the West than they did prewar. He reiterated the problem of scrap deficiency which has completely reversed and upset the prewar economy of the West Coast's steel industry and stated that by the end of the year the problem will be more severe when shipbreaking operations will be discontinued and additional capacity of western steel plants will come into production thus increasing scrap requirements.

W. J. JACK, former head of J. Jack & Heintz Co., Cleveland, has bobbed up at San Diego where he announces plans to start his own aircraft parts plant at nearby Escondido, in the virtual shadow of Palomar Mountain, where 2500 persons will be employed. The local chamber of commerce is raising \$30,000 advance for a 40-acre factory site.

Schmitt Steel Co. at Portland plans to start construction of a building to replace its forging shop which was destroyed by fire. L-shaped, one bay will be 45 x 220 ft and the other about 48 x 100 ft.

Reynolds Metals Co. has announced a \$500,000 plant at Vernon, Calif., for laminating metal foil.

When the Permanente Metals Corp. leased a War Assets aluminum rod and bar mill at Newark, Ohio, it postponed indefinitely its tentative plans for the installation of a similar mill at Spokane in connection with its aluminum rolling mill.

SALT LAKE CITY—The plate mill at the Geneva steel plant is down for a couple of weeks to permit installation of two additional rolls, a part of the program to convert the facility to a combination plate and high speed strip mill. The company expects to get into

production of light gage hot-rolled coils by the end of the calendar year.

Production at the plant has been off somewhat for the past several weeks due to a break-out in one of the blast furnaces. Because the plant is operating on a high ratio of pig iron to scrap, any drop in pig iron production is almost immediately reflected in the finished steel output. Shipments last month totaled 75,000 net tons of finished steel, of which 55,000 tons were plate and 20,000 tons structural shapes and billets.

In a recent talk before the Ogden Rotary Club, Dr. Walther Mathesius, president of Geneva, chided Utah state officials for "looking upon new and larger industries primarily as handy sources from which to collect disproportionately heavy direct taxes."

The company is currently tangled up with the State Tax Commission and the Supreme Court on two issues—collection of a sales or use tax on the purchase of the plant and an arbitrary valuation of iron ore for purposes of fixing a property tax valuation on the iron mining subsidiary. In both instances the company attorneys contend that the tax commission is going far outside its statutory powers.

Dr. Mathesius, however, recognized that some changes in the tax laws might be necessitated by the development of new industries.

"But," he emphasized, "if the tax laws, as they now exist, do not fit a particular situation . . . it should be for the legislature to decide whether or not a new law is needed or an existing one clarified or amended."

Beneficiation Process Is Convention Subject

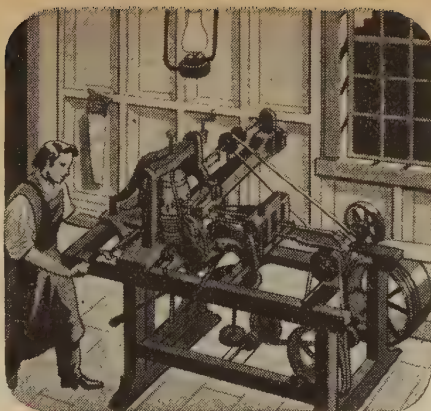
Fontana, Calif.

• • • Production of good metallurgical coke in the West has always been a problem. But the low coke rate at the Kaiser-Frazer here has prompted the interest of the entire iron and steel industry.

The beneficiation process used at Fontana to produce acceptable blast furnace coke, and some of the operating problems involved, will be discussed by C. H. Lenhart in his talk "Blast Furnace Practice at Fontana," before the Iron and Steel Exposition and Convention, Sept. 28 to Oct. 1, in Cleveland.



1 1827—Early machine tools were a result of shop owner and mechanic tinkering around, trying to step up output. They were hand built, crude, and no two machines were alike, since measurements were not yet standardized.

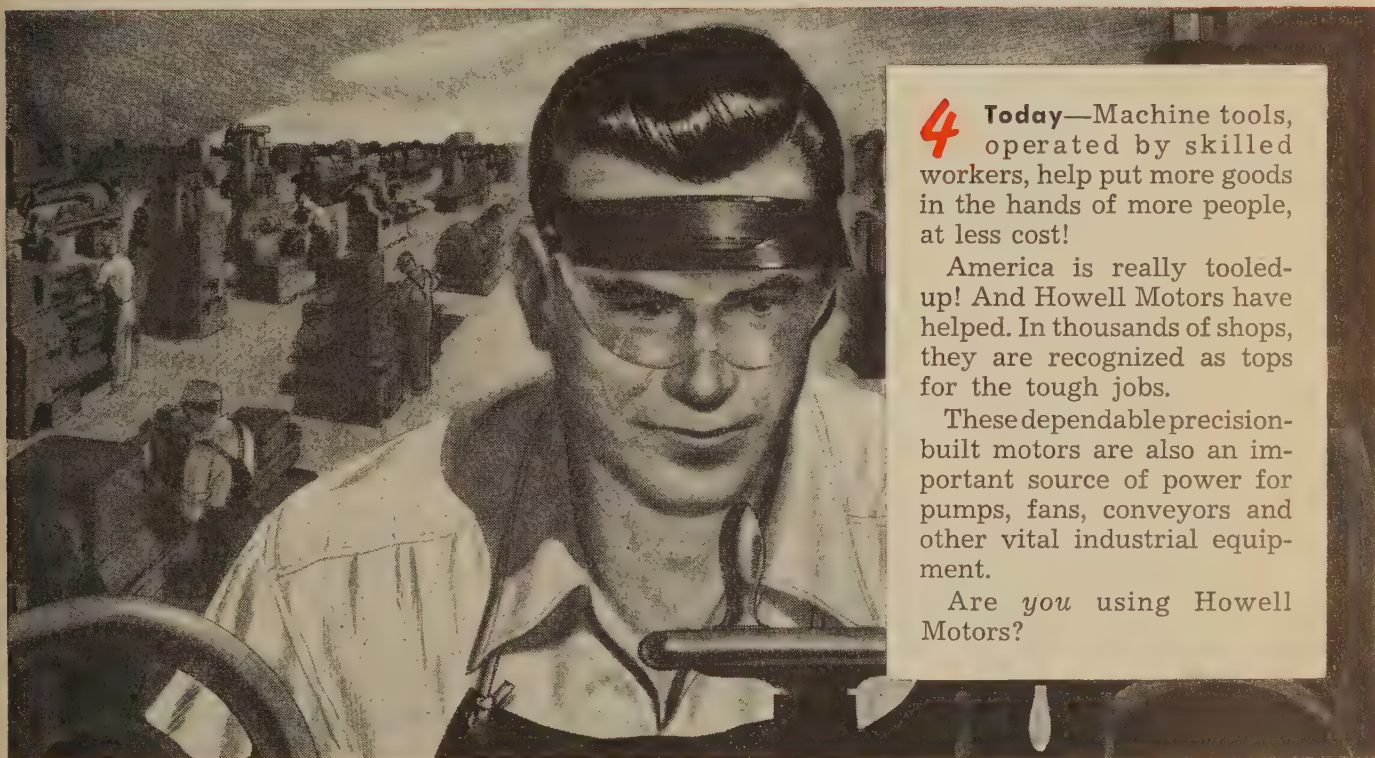


2 1855—Gradually, methods and techniques became more uniform, more exacting. Machine tools developed for one industry were tried successfully in others. But the real power behind machine tools, low-cost electricity, was still to come.



3 1915—Howell "Red Band" Electric Motors appeared. Applied to lathes, grinders, cutters, shapers and other machine tools, these rugged, industrial-type motors soon won wide acclaim for making good on hard jobs.

THEN, AMERICA TOOLED-UP!



4 Today—Machine tools, operated by skilled workers, help put more goods in the hands of more people, at less cost!

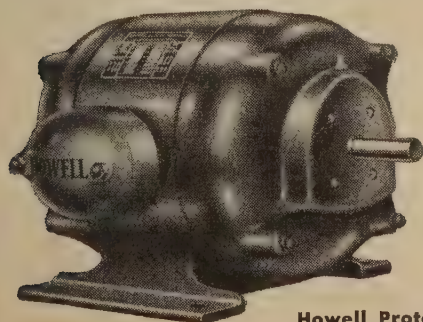
America is really tooled-up! And Howell Motors have helped. In thousands of shops, they are recognized as tops for the tough jobs.

These dependable precision-built motors are also an important source of power for pumps, fans, conveyors and other vital industrial equipment.

Are you using Howell Motors?

Free enterprise encourages mass production, supplies more jobs—provides more goods for more people at less cost.

Here's another precision-built Howell Motor . . . industrial type with copper or bronze bar rotors . . . specially insulated . . . statically and dynamically balanced.



Howell Protected Type Motor

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Manufacturers of Quality Industrial Type Motors Since 1915

- **William F. B. Henderson** has been appointed executive vice-president and will be elected to the board of directors of E. W. Bliss Co., Detroit, at a meeting of the board on Sept. 28. Mr. Henderson was formerly general manager of Briggs Mfg. Co.'s Plumbing Div., and for the past four years executive vice-president and director of Clearing Machine Corp., Chicago.

- **W. F. Longfield** has been appointed sales manager of the Warco Press Div., Federal Machine & Welder Co., Warren, Ohio. Mr. Longfield has been associated with the manufacture, design, sales and application of presses for over 35 years.

- **John S. Conway**, formerly export sales manager, has been appointed general sales manager for the Koehring Co., Milwaukee, succeeding **J. F. Robbins** who has been made president and general manager of Capitol Equipment Co., Harrisburg. **John E. Chadwick** has been named assistant sales manager and **R. E. Stewart** export sales manager of Koehring.

- **J. Colin Smith** has been transferred by the Aluminum Co. of America from special technical work with the American Magnesium Corp. of Cleveland to Fort Wayne, Ind., where he has opened a new office for the company.

- **Arthur Lowery**, formerly with the Wyman-Gordon Products Corp., Worcester, has recently been made sales manager for the parent company, Wyman-Gordon Co., Worcester Div.

- **Frank E. Scheliga** has been appointed superintendent, rolling mill, of the Torrance plant of Columbia Steel Co., Torrance, Calif. Mr. Scheliga joined this subsidiary of the U. S. Steel Corp. in 1938 as a laborer. In 1947 he was made assistant rolling mill superintendent, which position he has held until his present appointment.

- **George L. Best**, vice-president in charge of patent licensing activities of the Western Electric Co., New York, manufacturing and supply unit of the Bell System, has been named vice-president—finance, to succeed **T. Kennedy Stevenson**.

PERSONALS

• • •



ROBERT W. BRECKENRIDGE, president and treasurer, Automatic Die & Products Co.

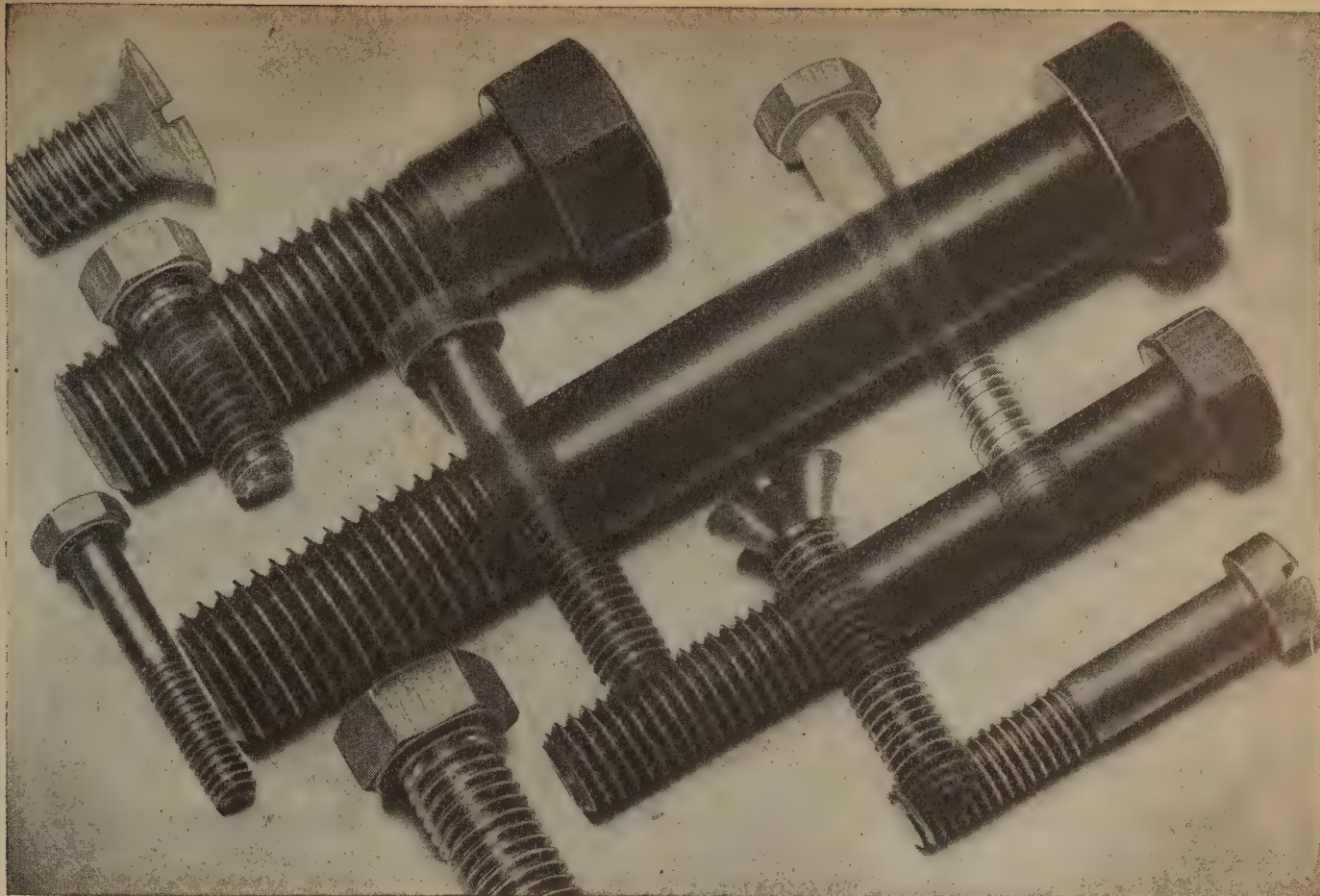
- **Robert W. Breckenridge**, formerly vice-president, has been elected president and treasurer of Automatic Die & Products Co., Bedford, Ohio. **H. W. Breckenridge**, formerly treasurer of the company, has been elected vice-president, **A. C. Smith** secretary, and **G. B. Gymer** assistant treasurer. **H. S. Lawrence** has been appointed sales manager.

- **J. Nall Candler** has been made assistant general manager of the Norge Div., Borg-Warner Corp., Chicago.

- **Lorne F. Lavery**, formerly manager of the Detroit office of New Departure Div., General Motors Corp., Bristol, Conn., has been made assistant general sales manager at Bristol. **Charles D. McCall**, formerly manager of automotive sales at Detroit, succeeds Mr. Lavery as manager of the central region. **Howard A. Offers**, sales engineer in the Chicago territory, becomes manager of the mid-western region with headquarters in Chicago. **Raymond J. Lynch**, formerly engineer of the Chicago office, is now supervisor of engineering for the central and mid-western regions.

- **Harlow H. Curtice**, general manager of the Buick Motor Div., General Motors Corp., Detroit, has been elected an executive vice-president and placed in charge of all general staff activities for the Corporation. **William F. Hufstader**, general sales manager of the Buick Div., **Ivan L. Wiles**, now divisional comptroller of the Buick Motor Div., and **John J. Cronin**, general manufacturing manager of the Fisher Body Div., have been elected vice-presidents of the Corporation. Mr. Hufstader succeeds **W. G. Lewellen** in charge of the distribution staff. Mr. Lewellen is resigning to go into business for himself. Mr. Wiles succeeds Mr. Curtice as general manager of the Buick Motor Div. and **L. C. Goad**, vice-president of the Corporation and general manager of the Fisher Body Div., has been appointed executive in charge of the body and assembly divisions group, succeeding **Thomas P. Archer**, vice-president, now on a disability leave. Mr. Cronin succeeds Mr. Goad as general manager of Fisher Body Div. **J. L. Jackson** is general manager of the newly-formed Ternstedt Div. of General Motors. **Stephen M. DuBrul** has been named head of a newly-created business research staff. **W. F. Armstrong**, a Corporation vice-president, has been appointed general manager of Chevrolet Motor Div. succeeding **Nicholas Dreystadt**, who died. **Fred W. Wieland** has been appointed Flint zone manager of Chevrolet Div. **Rodger J. Emmert**, factory manager of GMC Truck & Coach Div., has been transferred from Pontiac to Detroit to head the newly-created facilities and processing staff. Mr. Emmert has been succeeded in Pontiac by **Fred Falberg**. **John E. Johnson** has been appointed general truck sales manager succeeding **Joseph P. Little** who has been assigned to the staff of the general manager of the Truck & Coach Div. **Roger M. Kyes** has been placed in charge of a procurement and schedules staff.

- **John E. Meroney** has been appointed district sales manager in charge of the St. Louis division of Inland Steel Products Co. Mr. Meroney has served as the company's sales representative in that area for several years.



IT'S **"t.f.e."**

TO FASTEN QUALITY WITH QUALITY

Purpose of a fastener is to fasten. So the cheapest fastener is the one that fastens *best*, with minimum time for assembly, maximum holding power per dollar, and the ultimate contribution to the finished product's appearance.

Manufacturers of machinery and equipment have learned that specifying RB&W Cap Screws saves money all along the line. RB&W's investments in spheroidizing furnaces to improve structure of high carbon and alloy steels . . . mills to draw its own wire to closest tolerances . . . atmospheric-controlled furnaces for scientific heat treatment . . . are as important as the modern production machines in contributing to True Fastener Economy.

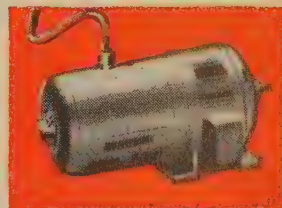
On *any* problem involving bolts, nuts, screws, rivets or specials, RB&W engineers will help you attain True Fastener Economy.



DESIGNING FOR T.F.E. Correct use of RB&W Cap Screws often permits reduction in number and size of holes, saving time and increasing strength of assembly.



CAP SCREWS FOR SEVERE SERVICE. Uniformly high strength, maximum toughness and adherence to close tolerances equip RB&W Cap Screws for severe stress conditions.



SUPERIOR APPEARANCE. The superior finish of RB&W Cap Screws enhances the appearance of the assembly and contributes to the sales value of the final product.

t.f.e.

**TRUE FASTENER ECONOMY
IS THE LOWEST TOTAL OF ALL
FASTENING COSTS**

**RUSSELL, BURDSALL & WARD
BOLT AND NUT COMPANY**



Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Oakland, Portland, Seattle. Distributors from coast to coast.

103 Years Making Strong the Things That Make America Strong

• **Walter J. Bloom** who has formerly been associated with Weirton Steel Co., has been named vice-president of General Sheet Steel Co., Detroit. Prior to his affiliation with Weirton, Mr. Bloom had been employed by Otis Steel Co. and Jones & Laughlin Steel Corp. in various metallurgical and sales capacities.

• **Walter E. McArthur** has been appointed eastern regional manager for the Nelson Stud Welding division, Morton Gregory Corp., Lorain, Ohio. **Robert H. Simon** has been named field engineer in the New York territory. **Gene P. Hopkins** has been appointed general works manager.

• **Otto G. Schwenk** has been appointed vice-president in charge of production, Yale & Towne Mfg. Co., New York. Previous to his new appointment, Mr. Schwenk served as assistant to the president of Weatherhead Co., Cleveland.

• **Henry V. Bootes**, formerly New York district sales manager, American Car & Foundry Co., has been named assistant vice-president. Mr. Bootes continues to make his headquarters in New York. Prior to coming to ACF in 1947, he was district manager of the Ohio Injector Co.

• **P. J. Jensen** has been appointed manager of the Michigan district for Carboly Co., Inc., Detroit, succeeding **M. E. Knoll**, who has retired. Mr. Jensen formerly served as executive engineer in the engineering and research department.

• **Frank J. Smith** has been appointed advertising and sales promotion manager of the Philip Carey Mfg. Co., Cincinnati, succeeding **Harold D. Bates**, who has recently been made general merchandise manager.

• **J. Earl Romer** has been appointed district sales manager of Bliss & Laughlin, Inc., at the Hartford office, succeeding **Walter A. Fairchild** of the J. Harvey Bryan Co., who has represented Bliss & Laughlin, Inc., in western New England. Mr. Romer has been in charge of Bliss & Laughlin's Cleveland office and previously represented that company in the Cincinnati district.



PARKER F. WILSON, president and director, Kerotest Mfg. Co.

• **Parker F. Wilson** has been elected president and director of Kerotest Mfg. Co., Pittsburgh. Former president **Walter G. Swaney** has been named vice-chairman of the board. Mr. Wilson has been associated with Otis Steel Co., Wheeling Steel Corp., and Pittsburgh Steel Foundry Corp.

• **Dr. D. P. Morgan** has been appointed vice-president in charge of the development department and **Dr. Carl F. Prutton** has been named director of research, Mathieson Chemical Corp., New York.

• **Paul S. Strecker**, assistant to the president, has been appointed works manager of the Toledo Machine & Tool Div., E. W. Bliss Co., Detroit. **R. E. Hinde**, formerly works manager at Toledo, is continuing at the Toledo plant as assistant to the works manager handling special assignments.

• **H. B. Brown** has joined the Fireproof Materials division of Inland Steel Products Co., Milwaukee.

• **John H. Owen** has been appointed Chicago district sales manager for Harbison-Walker Refractories Co., Pittsburgh. Mr. Owen has been associated with the company for more than 20 years, having started in the St. Louis district office. He was later transferred to Chicago sales office where he served in various capacities until his recent appointment.



S. J. MATCHETT, Detroit office manager, Pratt & Whitney Div., Niles-Bement-Pond Co.

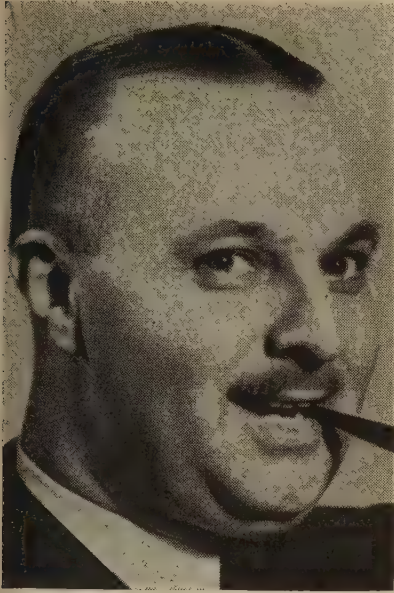
• **S. J. Matchett** has been named manager of the Detroit office of Pratt & Whitney Div., Niles-Bement-Pond Co., succeeding **H. William Kopf**, who died recently. Mr. Matchett heads Machine Tool Sales in Michigan.

• **R. C. Stobert**, for many years vice-president and general manager of Hardie-Tynes Mfg. Co., Birmingham, has been elected president of the company, succeeding **W. F. Tynes**, who died.

• **Russell T. Shafer** has been named manager, publicity division, Westinghouse Air Brake Co., Wilmerding, Pa., succeeding **James A. Ralston**, who has retired.

• **Walter S. McLucas** has been elected a director of Bendix Aviation Corp., South Bend.

• **George W. Schwager** has been made sales manager of Billings & Spencer Co., Hartford, succeeding **W. Dorsey Endres**, who has resigned. Mr. Schwager formerly served as field sales manager for Holo-Krome Screw Corp. **W. T. Johnston** has been named sales manager of the Chicago district and **John Donaldson**, sales representative in metropolitan New York and upper New Jersey. Mr. Johnston has formerly been associated with **W. O. Barnes Co.** and Mr. Donaldson is well known in and around New York where he has been active in sales work for many years.



LESTER B. HAMERSLEY, sales promotion manager, Firth Sterling Steel & Carbide Corp.

• **Lester B. Hamersley** has been appointed sales promotion manager by Firth Sterling Steel & Carbide Corp., with headquarters at McKeesport, Pa. Mr. Hamersley has formerly been associated with Signode Steel Strapping Co. and Fairbanks Morse & Co.

• **William H. Starbuck** has been appointed assistant general sales manager of the Kellogg division of American Brake Shoe Co., with his headquarters in Rochester. Mr. Starbuck, formerly sales representative, has served in various sales capacities since joining the company.

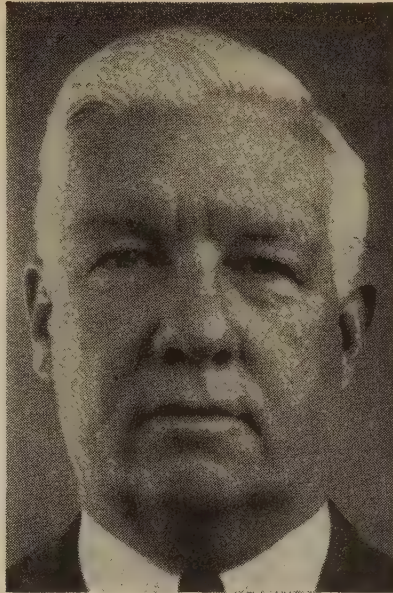
• **Carl F. ter Weele** has been appointed export manager of Farrel-Birmingham Co., Inc., with headquarters in New York.

• **William H. Higbie**, 58, structural engineer, Jones & Laughlin Steel Service Inc., Long Island City, N. Y., died Aug. 30.

• **Roswell A. Holcombe**, 61, formerly secretary to the president, Carnegie-Illinois Steel Corp., Pittsburgh, died recently.

• **Walter C. Winkel**, 59, president of Modine Mfg. Co., Racine, Wis., died Aug. 22.

• **Jess F. Roberts**, 32, superintendent of the Inca Metal Products Co. Inc., Birmingham, died Aug. 26.



CURTIS G. GREEN, Chicago district manager, Baldwin Locomotive Works.

• **Curtis G. Green** has been named manager of the Chicago district office of the Baldwin Locomotive Works, succeeding **D. I. Packard**, who has resigned. Mr. Green has been with Baldwin since 1920.

• **A. W. D. Black** has been appointed district sales engineer for Rhode Island, Eastern Massachusetts and Maine, by the Butterfield Div., Union Twist Drill Co., Derby Line, Vermont. Mr. Black has his office in Beverly, Mass. He has formerly been associated with Reid Bros. Co. Inc. and F. H. Robertson Co. Inc.

• **Victor A. Lee** has been elected vice-president in charge of sales of the American Sealcone Corp., New York.

• **Gustave R. Geiger** has been appointed supervisor of quality control of SKF Industries, Inc., Philadelphia. Associated with the company since 1941, Mr. Geiger succeeds **Gustave A. Johnson**, who has been appointed night superintendent of the company's main plant in Philadelphia.

• **John H. Poulson** has been appointed to the board of regional sales supervisors, covering eastern United States and Canada, Eutectic Welding Alloys Corp., New York.

• **Fraine B. Rhuberry** has been appointed head of the Ford Motor Co., S. A., Mexico, succeeding **Benjamin Kopf**, who has resigned. Mr. Rhuberry has formerly been associated with General Motors in Mexico. **John B. Millis** of the Ford News Bureau has been appointed public relations director of the Lincoln-Mercury division, Dearborn. **Fred Schouman**, formerly with Lincoln-Mercury, has joined the Ford News Bureau. **Virgil LaMarre** of the News Bureau has been named central region public relations director.

• **Henry M. Harrold** has been made vice-president of operations of Bridgman Castings, Inc., Bridgman, Mich., a subsidiary of Hanfin Corp. Mr. Harrold joined the Bridgman organization as sales manager earlier this year. He was formerly associated with Sperry Gyroscope Co. and Caterpillar Tractor Co.

• **C. W. T. Stewart** has been elected president to succeed the late **Walter L. Conwell**, Safety Car Heating & Light Co., Inc., New York.

OBITUARY...

• **Chandler Rhodes**, 79, former sales manager of National Lead Co., Buffalo, died Aug. 26.

• **Frank A. Avery**, 80, former secretary of the Buffalo Scale Co., Buffalo, died Aug. 30.

• **Carl A. Carlson**, 60, sales engineer for Norton Co., Worcester, died Aug. 29.

• **John A. Morrison**, 70, president, Car-Mor Metal Co., Philadelphia, died Aug. 29.

• **Joseph B. Morten**, 81, retired vice-president of the former Domhoff & Joyce Co., Cincinnati, died Aug. 30.

• **Edward H. Read**, 79, retired general northern sales agent, Delaware, Lackawanna & Western Coal Co., Buffalo, died Sept. 2.

• **Emil R. Gasser**, 44, research director of the Farrel-Birmingham Co. Inc., Buffalo, died Sept. 4.

• **Joseph H. Hazley**, a member of the board and formerly vice-president, Jacobs Mfg. Co., Hartford, died Aug. 4.

European Letter . . .

• Primary objective of currency reform is stabilization of China's finances . . . Sino-American Committee for administration of assistance funds first real show of strength by opponents of Communism in China.



LONDON—Since the military successes obtained by the Chinese Communist armies early this year, there has been a disposition in some quarters to write off the regime of President Chiang Kai-shek as a lost cause. The patient has appeared to be sinking rapidly and discussion has been directed rather to the character of his heir than to his own chances of recovery. During the last months or so, however, the American doctors by the bedside have been administering injections of such potency that the presumed corpse has been showing signs of renewed vitality; there have also been signs that the patient's own constitution is somewhat tougher than was generally supposed and will not easily give up the ghost. Kuomintang China is still a very sick man, but there are grounds for questioning the recent statement of an observer of Chinese affairs that "all realistic political speculation now begins with the assumption of a final Nationalist military defeat."

The currency reform which has been taken in hand is the first really serious attempt to tackle the riot of inflation made by the Chinese Government since the

Chinese dollar began to get out of control under pressure of the Japanese invasion. Whereas China's last great monetary reform was planned with the advice of a British expert, Sir Frederick Leith-Ross, this one, as is natural in the changed circumstances of the time, is being carried out with American advice and financial backing. A Nanking decree of August 19, announced the establishment of a controlled gold standard "gold yuan" with 100 pct reserve cover convertible, "under control," into foreign exchange. The new yuan is to be worth 25 cents in American currency and will be exchanged for 3 million *fapi* or Chinese dollars of the old inflated currency. The primary object of this reform is to stabilize China's finances, revive production and provide definite rates for foreign exchange. A secondary object is to render useless the large amounts of *fapi* held by the Communists (in addition to their own LA or Liberated Areas currency), which has hitherto been used by them for secret buying of commodities in Government-controlled areas or purchase of American dollars on the black market.

HOW far this currency reform proves effective will depend on the degree to which its various provisions are administratively enforced, and the story of economic controls in China has not been such as to give rise to an easy optimism on the subject. Yet there are signs of an altogether unwonted resolution in grasping the nettle. The Americans, with memories still fresh of the misuse of UNRA aid to China and of earlier American

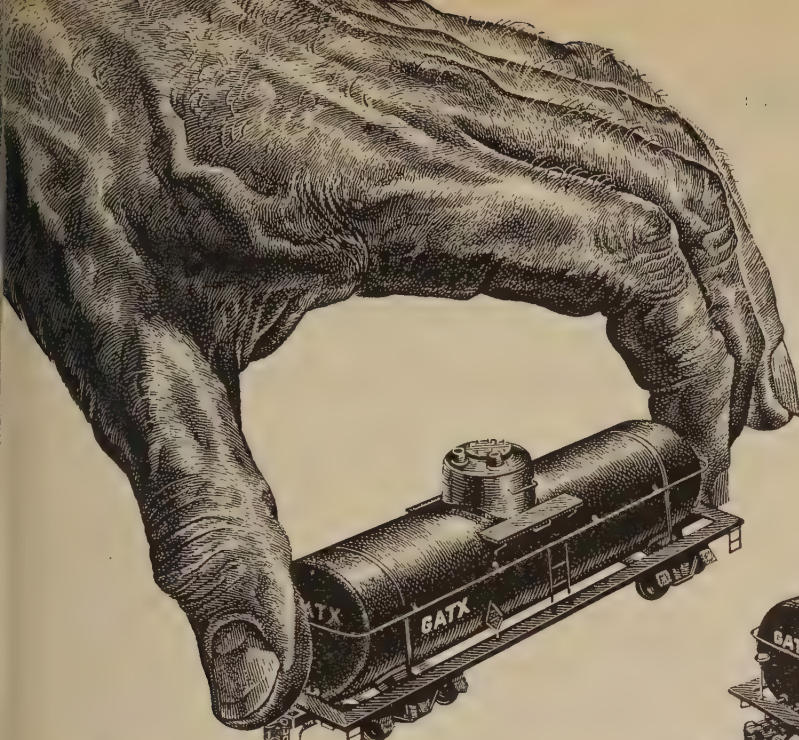
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attempts at economic assistance, are concerning themselves with the details of the new financial measures in a manner which suggests that the grosser forms of corrup-

tion will no longer be overlooked; a Sino-American committee with three Chinese and two American members has been formed to administer the American funds which have been voted by Congress. Converging with this American pressure, the reformist group within the Kuomintang has been active in demanding a financial overhaul as an essential condition of the struggle against the Communists. General Li Tsung-jen, who was elected vice-president by the National Assembly contrary to the wishes of Chiang Kai-shek, is reported to have refused to take up his office unless a successful start were made with currency reform. President Chiang has responded to this agitation by appointing his eldest son, General Chiang Ching-kuo to enforce the currency law in Shanghai, and the latter has hinted in a speech that measures will now have to be taken against persons hitherto immune from the application of economic controls. Some very privileged fish will no doubt still succeed in slipping through the net, but it seems possible that the meshes are this time going to be drawn closer than they have ever been before.

Closely linked with the new fight against monetary inflation is the scheme for applying part of the American assistance funds directly to rural rehabilitation under joint Sino-American supervision, which in this case also is to take the form of control by a commission with three Chinese and two American members. This move is the first real counter-attack on the Communist political offensive among the Chinese peasantry. The Communist exploitation of agrarian land-hunger has at least forced one thought into official minds in Nanking and Washington: that the Chinese peasant matters, that he is indeed the most important factor in the civil war. Unless and until the opponents of Communism in China can show the villager that

(CONTINUED ON PAGE 148)



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is filling the gaps
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Industrial News Summary...

- **Steel Supplies Are Tighter**
- **Inventories Are Not Large**
- **Conversion Is Here to Stay**

SOME items made from steel may be easier to get than they were a year ago. But no general conclusions can be drawn from this condition. Appliance sales have been used to show that the steel picture may be changing. It isn't. The growth—if any—in steel inventories is negligible.

Slackening of sales for certain types of home appliances when put in terms of steel tonnage is unimpressive. Steel users are a long way from having what they consider to be normal inventories. For the past 3 years it has been repeatedly hoped that things would ease. They haven't. And they won't from an overall standpoint, as long as the demand from manufacturers continues as it is this week.

Four reliable indicators prove at present that steel inventories are not heavy. These yardsticks are: (1) Nerve wracking pressure on steel salesmen by consumers, (2) heavy and unsatisfied demand for ingot molds for conversion deals, (3) strong gray market in pipe and flat rolled steel products and (4) no significant drop in employment in industrial circles.

Add to this—hard earned cash being spent by steel companies to increase production. It seemed this week that no matter what action had been taken to increase steel production demand had kept pace, so that no headway was visible. Some headway has been made. But it is slow business. Soft tendencies in one channel are offset by hard spots in others.

Sheet steel inventories are no better today than they were 6 months ago. A company may have had 3 or 4 days' supply last January. Today they might have 6 to 8 days. This is a long way from a working balance in material supplies. The threat of channeling more steel for essential, or voluntary allocation purposes is more than a possibility. It is a stark fact that keeps the regular, normal steel user in a constant state of anxiety—lest someone else get more than he does.

WAREHOUSE steel demand is heavier and more diversified than ever. This means that the small user is still without enough steel to keep his operations where he thinks they ought to be. The continual pressure from warehouses on their steel sources is nothing more than an indication that they can't keep up with demand.

Midwest steel consumers believe that the next 5 months will be just as rough on them as have been the last 5 months. Steel officials in that area are not happy with the trend voluntary allocations have taken. They still have a fear complex carried over from the wartime priority system. They know what pressure in Washington can do to the voluntary allocation plan.

This week the steel gray market is still active. It

will stay that way as long as someone has something the other fellow wants enough to pay a price. The heavy allocation of plates for essential business has zoomed the gray market prices on plates. If the manufacturer can't get them from the mill then he has to get them somewhere else. He is. And he is paying a fancy price if he wants plates badly.

Three months ago some types of carbon plates were bringing \$115 to \$140 a net ton on the gray market. This week brokers were in some cases offering the same kind of plate for \$250 a ton. And they will probably find a buyer at that price. This does not mean that a large tonnage of plate is going at that figure—it is a trend that shows what tightness can do to a steel product.

STEEL conversion deals are here to stay. Groups who have been unsuccessful in being classified for voluntary allocations use conversion plans to a wide extent. These companies who are using steel made through conversion (either ingots or semifinished steel is furnished by one or several steel plants from which finished steel is made) owe a large part of their current operations to this "lifesaver."

Conversion steel is getting to be a big item in oil company requirements. Some of the individual plans are complicated. But all of them point up one thing—putting to a good use through a chain of cooperation what otherwise would be lost in the shuffle. The cost of the conversion route is high. But it is producing more steel for more purposes than ever before. It is not to be confused with gray market sales of steel—there is quite a difference.

Steel production this week was on its way to bumping the roof of current capacity. Output was up one half a point from last week's revised rate of 95.5 pct to 96 pct. It is unlikely that the level can be pushed up more than a point or two—but that is a probability not a possibility.

The steel distribution questionnaire sent out by the Senate Small Business Committee will provide historical information for the National Archives. Inquiries are now in the hands of steel companies. Some firms will run into clerical difficulties in filling out the questionnaire. The information it will provide on steel distribution by states and a few specific areas will not be much news to steel companies. Most of them have a fairly good idea of that now. They are less certain about steel distribution by counties—a factor that looms large in any market study. County distribution by product is still a matter of guesswork but it is important because freight rate boundaries (which establish natural market areas) cross state lines.

• **INSULT TO INJURY**—In the past demands for the steel industry to increase capacity have come mainly from government economists and union leaders. Last week a steel consumer voiced the same suggestion. Andrew H. Phelps, vice-president in charge of purchasing, Westinghouse Electric Corp., cited August steel production of nearly 7.5 million tons as the equivalent of about 90 million tons a year. "This is still inadequate to handle all the programs we now have with us and those which will arise in the future," he said. Steel must be provided to care for the increases in population, normal wear and tear and new developments, Mr. Phelps added. "Some of our steel shortages are temporary; but many of them, I feel, will be with us for several years."

• **HIGH POLICY**—British trade unionists have been meeting in annual congress discussing matters of high policy and endeavoring not to embarrass the Labor Government in doing so. The leaders of the unions had a hard job at times. The rank and file are not altogether happy, for instance, about wage-freezing, which is part of the government's anti-inflation policy. There was plenty of argy-pargy but it didn't keep the representatives from backing Mr. Atlee's Cabinet.

• **PRICE INCREASE**—SKF Industries, Inc., has announced that it will increase prices, effective Oct. 1, on most of the company's products. Reason given for the increase was "steadily rising manufacturing costs. While the price changes will not be uniform over the range of bearings produced by the company, the increases will average less than 10 pct, R. R. Zisette, general sales manager, explained. Price increases will also apply to steel, bronze, stainless steel, and monel metal balls.

• **ANTITRUST SUIT**—Civil antitrust suits charging restrictive distribution arrangements were filed Sept. 9 against International Harvester Co., J. I. Case Co., and Deere & Co., makers of farm machinery. The companies are charged with suppression of competition by agreements with their retailers which prevent rival companies from using certain market outlets. Officials of all three companies shortly after the government announcement, said they were sure there was little foundation for the charges that have been made.

• **ECA APPROVES**—Procurement and reimbursement authorizations amounting to nearly \$4.1 million worth of industrial machinery and machine tools for Holland and Denmark were approved by the Economic Cooperation Administration last week. Dutch purchases, some of which have been already transferred, included machine tools, \$440,000; tractors, \$800,000; general purpose machinery, \$525,000; miscellaneous machinery and parts, \$1,670,000; trucks, \$350,000, and, \$50,000 worth of woodworking equipment. Danish purchases were \$212,000 worth of machine tools including grinding, shaping and shearing machines, boring and milling machines, lathes, presses and thread cutters. Other requirements were mobile cranes and miscellaneous equipment.

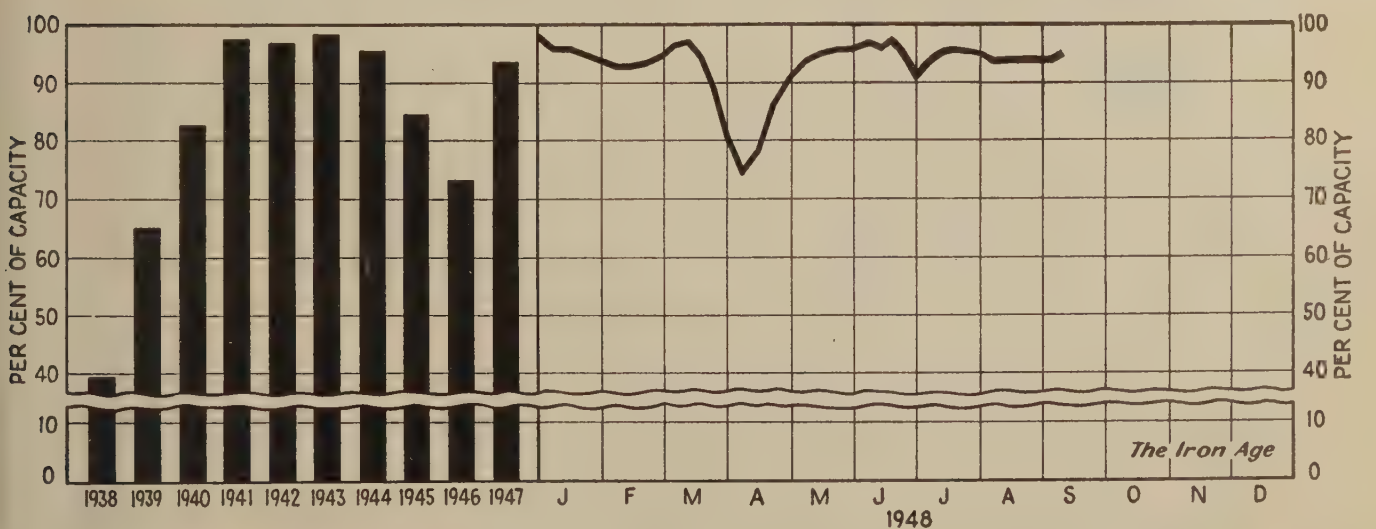
• **NON-COMS COMPLY**—Total unions complying with the non-Communist and financial reporting requirements of the Taft-Hartley Act increased by 439 (4 national and 435 locals) during July, National Labor Relations Board figures show. As of August, 171 national and 8532 local unions were in full compliance. Approximately 76,700 union officers have filed non-commie affidavits.

• **BIG NUGGET**—The first gold medal in the history of the Gray Iron Society will be struck and offered as the highest award to individuals rendering "outstanding, unselfish" service in behalf of the industry. The medal, to be presented at the 20th annual meeting of the society in Atlantic City, Oct. 14-15, is solid gold and measures 2½ in. in diam, ¼ in. in thickness and weighs nearly 4 oz.

• **S. A. TAKE IT AWAY**—The Argentine Government purchasing commission in London has written a \$24 million contract with United Steel Companies, Ltd., Sheffield. The agreement calls for delivery of 250,000 tons of rails and fish plates over the next 6 years. United will share the order with rail makers in Northeast England, Scotland and Wales.

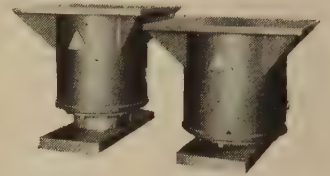
• **STEEL REVIVAL**—Western Germany's iron and steel industry set another postwar production record in August, according to the American Military Government. The biggest gain was in ingot production which amounted to 510,000 metric tons in August. This was a 12 pct gain over July and 28 pct better than the target figure. Pig iron output rose to 433,500 tons, a gain of 8 pct over July; finished steel products to 344,500 tons, also an 8 pct increase.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
Sept. 14.....	97.0	96.0*	91.0	87.0	94.0	105.0	102.0*	102.0	102.0	91.5	103.0	91.5	98.0*	95.5*
Sept. 21.....	97.5	96.5	92.0	87.0	95.5	105.0	100.0	102.0	101.0	86.0	110.0	91.5	98.0	96.0

* Revised.



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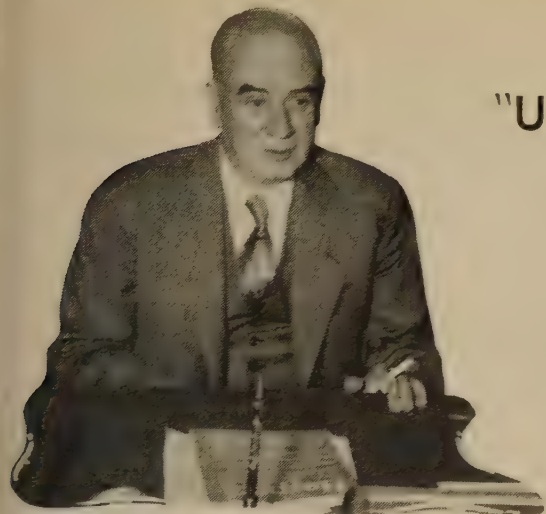
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"Unfinished Business" Dispels Rumors of Murray's Retirement

By TOM CAMPBELL
News-Markets Editor

New York

• • • Phil Murray is hale and hearty. He looked in the best of health last week. He is more calm than many a steel leader from whom he has snatched a contract. He likes being head of the CIO. The rank and file of that turbulent group like him. And they will keep him as their man as long as he wants it. They know he is no self-seeker. His record shows that. Other would-be "presidents" can't quite match that trait.

In the past years a lot of steel officials have wondered about Mr. Murray. Was he tired? Would he retire? Who would take his place, etc.? Some of this speculation was due to well organized whispering campaigns. Right now a new aspirant seems to be Walter Reuther in Detroit. Despite his ideas on a labor party or his standing in the United Automobile Workers, he hasn't the slightest chance of being top CIO man—as long as Phil is around.

Mr. Murray would have stepped down from the CIO presidency some time ago if (1) the membership wanted it and (2) if he and his friends saw the type of man who had what it takes to keep this group together for a common purpose. Rumors have frequently been started that he was through. He is still there. And he is still getting results in unspectacular ways.

Why doesn't Phil leave the CIO to someone else and just settle down as head of the steelworkers? This query comes privately from many steel men from time to time.

The answer is simple. He doesn't want to. He likes the CIO as well as he likes the steelworkers. But the USWA is really his baby. He kept it going and growing after parting with John L. Lewis.

The district jobs of the USWA at one time were heavily loaded with Phil's old union, the United Mine Workers. They had to be. The organizing phase was on. But that isn't true today. Most of the district jobs in USWA are held by steel men. Some are up from the ranks. Quite a few were rolling mill foremen. And a lot are in there because they think they have a mission in life—aside from a good job.

The atmosphere around the steelworkers' international headquarters in Pittsburgh is no different than in any large steel firm. Meet-

ings are held. Callers are frequent. And it is seldom that visitors fail to see their man or leave without getting an answer to their queries. Phil Murray, as head of the steelworkers, is in the same position as Ben Fairless or any other steel official. And he is going to stay in that union as long as he wants—and until he gets down to brass tacks on a few of his pet ideas.

As for his successor in the steel union, that is unimportant now. Or put it another way—it is no more important than who will succeed Ben Fairless when he retires some years hence. A lot of people are in the running. They are all learning the hard way under Mr. Murray. If some name Dave McDonald they may be right. If some name others they might also be right. But whoever fills the job will not do so for quite a while unless something unusual happens.

Like all good organizations USWA depends on cooperation from all sides. If it isn't forthcoming something gives. It is usually the one who doesn't cooperate. The record shows that. So 12 years after starting with nothing and with the steel labor rate averaging 65.5¢ an hour (it is now about 1.69¢ or more an hour) the steelworkers are entering the "consolidation" stage.

They are all set for it. It is doubtful if any large hourly wage increases are in the cards for quite a while. Each year they have been smaller. This year they were on a

Background

New York

• • • For the past few years Phil Murray has been mentioned in steel officials' private conversations. Will Phil stay as CIO president? Will he retire from CIO and stay as head of the steelworkers? How is his health? Will Mr. Reuther get a chance at the CIO presidency? Will there be a new CIO president? Who will take over the steelworkers when and if Mr. Murray retires? These are only a few questions that have been batted around. Most of them are answered in this news story. And an analysis is also made of the trend in steel labor relations. Steel labor is a definite part of any plans that metalworking executives conceive for the future.

Industrial Briefs . . .

• ACQUIRES FULL CONTROL—

The entire common stock equity in Vascoloy-Ramet Corp., Waukegan, Ill., held by Vanadium-Alloys Steel Co., has been acquired by Fansteel Metallurgical Corp., North Chicago, Ill. Vascoloy-Ramet, manufacturers of refractory metal carbide products, will continue to be operated under its own name as a division of Fansteel.

• EXPANSION PROGRAM—Borg-

Warner Corp. has announced plans for the immediate construction of a \$2,650,000 combined production plant and research laboratory on a 35-acre site adjacent to Cleveland to house the company's Pesco Products Div. The plant is expected to be completed by next May. A separate \$200,000, 7920-sq ft laboratory building is already under construction adjacent to the site of the new factory building.

• NEW COMPANY—H. Braun Tool & Instrument Co., Inc., 140 Fifth Ave., Hawthorne, N. J., has been formed recently. They will manufacture beryllium copper stampings as well as short run stampings of other non-ferrous materials.

• PARSONS RESIGNS—After 18 years in the position, Dr. A. B. Parsons has resigned as secretary of the American Institute of Mining & Metallurgical Engineers effective February 1949. E. H. Robie, who has been Dr. Parsons' principal assistant during nearly all of his tenure of office, will be acting secretary during the remainder of the year.

• TOOL DISTRIBUTOR—The Geometric Tool Co., New Haven, Conn., has announced the appointment of Mideke Supply Co., 100 E. Main St., Oklahoma City, Okla., as their distributor for the State of Oklahoma for standard threading tools and chasers.

• MOVES—The Roller Tool Co. has announced the removal of their office and plant to new and larger quarters at 23919

Little Mack, St. Clair Shores, Mich.

• OPENS WAREHOUSE—J. H. Williams & Co., Buffalo, manufacturer of drop forgings and drop-forged tools, has announced the opening of a warehouse and sales office at 2266 E. 38th St. (Vernon), Los Angeles on Oct. 1.

• ADDS TO PLANT—The Precision Tube Co., Inc., manufacturers of small nonferrous tubing, has announced that it is nearing completion of its expansion program. This program includes acquisition of additional production capacity, modernization or replacement of existing equipment and an increase in plant area with a total expenditure approximating \$120,000.

• TO HANDLE PRESSES—Hoffman-Marquard Iron & Machine Co., St. Louis, has been appointed dealer for the line of open back inclinable punch presses made by L & J Press Corp., Elkhart, Ind.

• ACQUISITION—James P. Marsh Corp., Skokie, Ill., manufacturers of precision instruments, has announced the acquisition of the Witt Gauge Div. of National Pressure Cooker Co., Eau Claire, Wis., effective Sept. 30. The identity of the Witt line will be preserved but Witt gages including oxygen and welding gages, will be produced in the Marsh plant.

• CONTROL AGENT—The appointment of Charles W. Synder Co., Inc., 1001 N. Wheeling St., Tulsa, Okla., as midcontinent distributor for Kieley & Mueller automatic pressure and level controls has been announced.

• OPEN HOUSE—In cooperation with the Commonwealth in the observance of "Pennsylvania Week" Sept. 26 to Oct. 2, Lukens Steel Co. and its divisions, By-Products Steel Co. and Lukenweld, Coatesville, will have open house on Sept. 30. A second open house will be held on Oct. 7.

percentage basis. That put the higher bracket fellows in a better mood. What is the future trend? It is simple to forecast it if you know Phil Murray.

Any attempt in the future to reduce labor rates will run smack up against a stalemate—even if such an attempt should come it is a long way off. The real fight now will be on social security. And to Phil Murray social security means more than sick benefits. To him it means a lot of things including pensions and an annual wage.

Next year's conferences will certainly involve arguments on sick benefits, insurance and other social phases. Main argument will be who will pay—the company, the worker or both. Naturally the union will try for the first, while the steel companies will hope to compromise—if they can't get out of the whole thing—on a contributing plan.

Phil Murray, however, will have a lot to say about pensions. Steelworkers see coal miners getting \$100 a month. Because the steel companies agreed to this, with a gun at their heads, does not mean that the slugging feast on that problem will be any softer. Both the steel union and steel firms will be knee deep in social security studies between now and next year.

Steel firms believe that pensions will not come up until 1950—by their interpretation of the contract. But they shouldn't be so sure of that because they are going to come up next year. Whether or not pension talks get anywhere is another matter. They are coming up for discussion.

After the social security package is settled one thing remains that is close to Philip Murray's heart. If he can swing it, he will, for the first time, be satisfied with his lifelong efforts. That is the annual wage. It may be shelved now. It may come up. It may be dropped. But each time it is dropped it will come up again and the man pushing it will be Phil Murray. U. S. Steel knows this. That is why they have the subject "under study"—or at least they can restudy the study they made some time ago. Then they said no soap. Someday—well, the fat's on the slow fire in the backroom.

Coking Coal Supply Has Improved Substantially Since Last Fall

Pittsburgh

• • • Coking coal supply has taken a definite turn for the better. The patient is out of danger; he is taking nourishment and feeling pretty chipper. It will be a while, however, before he feels like playing 60 minutes of professional football. The men who buy metallurgical coal and operate the steel industry's coke ovens generally report: (1) Supply is excellent; (2) quality is a lot better than it was a year ago; (3) quality could still be improved substantially; new washing equipment will start doing this in the near future.

The quality of the coal now available is better than it was a year ago because it need no longer be bought from poor quality marginal mines. The improvement is enough to increase pig iron output—other things being equal. Both as to quantity and quality, metallurgical coal is better today than it has been at any time in the past 8 years.

However, many of the coke oven stockpiles now contain some low grade coals. This is why some buyers have temporarily stepped out of the market. They intend to work these piles down, charging some poor and some good quality coal until they have used up the bad material. Until this is done, size of stocks at coke ovens will not be a true measure of the amount of metallurgical coal immediately available to the industry.

Stockpile size does give some indication of conditions, of course. Those at coke ovens were estimated at 34-days' supply in July, according to the latest figures of the U. S. Dept. of the Interior. The June figure was 39 days. The year's low point occurred in April during the coal strike. At the end of that month stocks were good for only 20 days.

Coking coal conditions are better today than they were last fall for three reasons: (1) John L. Lewis; (2) a sharp drop in coal exports; and (3) improved freight car distribution. These are imme-

Inferior Coals Now Go Begging But Further Improvement In Quality Is Needed

By GEORGE F. SULLIVAN

Pittsburgh Regional Editor

diated—they are here. Improved coal washing facilities will boost pig iron output as soon as they make better grade coal available to the ovens; hence, better coke for the blast furnaces.

Mr. Lewis appears at the head of the list because the long coal strike that most operators feared in July did not materialize. However, in anticipation of one, steel companies built up stocks by open market purchases of any coal that would be at all useful in their ovens. Stocks of coal above ground are now substantial; demand has eased in relation to supply and prices are tending to softness.

Coal exports this year to Aug. 21, 1948, were 12,943,968 net tons; 1947 exports to Aug. 23 were 22,244,418 net tons, according to the Bureau of Mines. Thus exports this year are off by over 9 million tons, a collapse of almost 42 pct. Theoretically, only steam coal was exported but informed sources asserted last year that coking coals were actually being exported in volume, though the tonnage was never determined.

Overall freight car supply has not improved substantially but its distribution has. One reason is that a number of marginal mines have gone out of business and the cars that roads formerly had to supply to them can now be more efficiently loaded and routed from the larger mines.

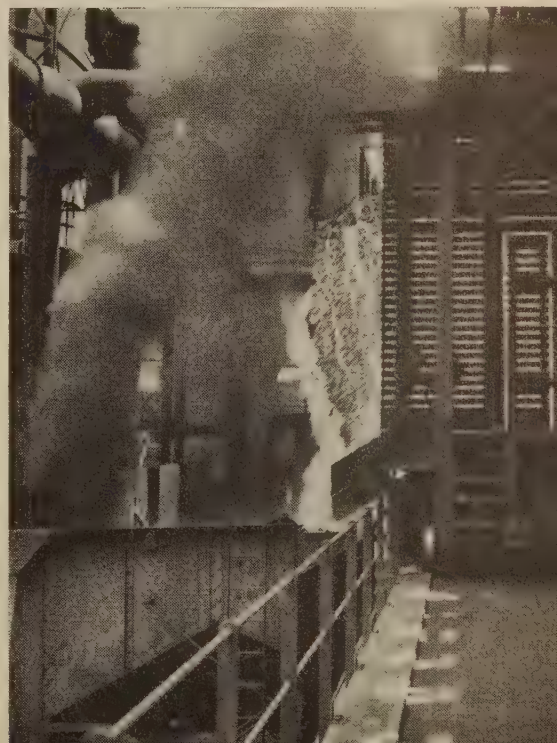
A year ago some strip mined coal was bought for coking, so desperate was the overall supply picture. This type coal is no longer needed. It is even pre-

dicted that many strip mine operators who coined money hand over fist in the last few years may soon be out looking for road construction jobs.

Coke oven operators in several localities are now working off their inferior stocks. A lot of this is ramp loaded coal which meant several different types of poor coal arrived in a single car. Aside from the desire to clean up these stocks there is an urgent necessity of doing so because they are a fire hazard. The mixture, like a martini cocktail, is loaded with the ingredients of spontaneous combustion.

The big benefits of washing facilities—coal laundries—are still to be felt. The two largest under construction will be able to produce a total of 2350 tons of washed coal per hr. U. S. Steel's H. C. Frick Robena equipment will be installed in units. The first unit, which should be

THE BIG PUSH: A charge is pushed from a byproduct coke oven into a hopper car which will carry it to the quench house. The operation, shown, is taking place at the Koppers plant at Kearny, N. J.



running this year will yield about 750 tons of washed coal hourly. Jones & Laughlin's Vesta mine should have its new washing facilities in full operation by mid-1949, producing about 1600 tons of washed coal per hr. Though these are believed to be the big-

gest units now going up others are coming along and the Robena unit may be further expanded.

The fact that coking coals of fair quality can be had by almost anyone who wants to buy them is a good sign for the present. However, the current outlook

would darken if coal miners decided to work only 5 days a week. Present supply prospects, with the washing facilities coming along, mean a definite improvement in pig iron production, another way of saying more steel from current facilities.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1948

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January.....	6,768,497	95.5	343,169	77.5	361,110	79.0	7,472,776	93.6	1,686,857	4.43
February.....	6,245,338	94.3	340,596	82.3	354,270	82.9	6,940,204	93.0	1,676,378	4.14
March.....	6,841,578	96.6	363,235	82.0	403,322	88.2	7,608,135	95.3	1,717,412	4.43
1st Quarter.....	19,855,413	95.5	1,047,000	80.6	1,118,702	83.4	22,021,115	94.0	1,693,932	13.00
April.....	5,640,168	82.2	185,089	43.2	392,900	88.7	6,218,157	80.4	1,449,454	4.29
May.....	6,799,289	96.0	355,562	80.3	416,801	91.1	7,571,652	94.8	1,709,177	4.43
June.....	6,481,879	94.5	356,810	83.2	417,665	94.3	7,256,354	93.8	1,691,458	4.29
2nd Quarter.....	18,921,336	90.9	897,461	69.0	1,227,366	91.4	21,046,163	89.7	1,617,691	13.01
1st 6 months.....	38,776,749	93.2	1,944,461	74.8	2,346,068	87.4	43,067,278	91.9	1,655,797	26.01
* July.....	6,348,057	89.8	324,991	73.6	395,610	86.7	7,068,658	88.7	1,599,244	4.42
† August.....	6,620,567	93.4	371,205	83.8	425,827	93.1	7,417,599	92.9	1,674,402	4.43
September.....										4.28
3rd Quarter.....										13.13
9 months.....										

YEAR 1947

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January.....	6,550,058	95.2	384,096	87.7	288,458	66.9	7,222,612	93.2	1,630,386	4.43
February.....	5,835,018	93.9	314,912	79.6	280,471	72.0	6,430,401	91.9	1,607,600	4.00
March.....	6,619,641	96.2	378,893	86.5	318,440	73.8	7,316,974	94.4	1,651,687	4.43
1st Quarter.....	19,004,717	95.1	1,077,901	84.8	887,369	70.9	20,969,987	93.2	1,630,637	12.86
April.....	6,365,670	95.5	375,675	88.6	310,497	74.3	7,051,842	93.9	1,643,786	4.29
May.....	6,640,004	96.5	372,878	85.2	326,132	75.6	7,339,014	94.7	1,656,662	4.43
June.....	6,317,705	94.8	351,247	82.8	308,762	73.9	6,977,714	92.9	1,626,507	4.29
2nd Quarter.....	19,323,379	95.6	1,099,800	85.5	945,391	74.6	21,368,570	93.9	1,642,473	13.01
1st 6 Months.....	38,328,096	95.4	2,177,701	85.2	1,832,760	72.8	42,338,557	93.5	1,636,589	25.87
July.....	6,033,512	87.9	256,125	58.6	289,048	67.2	6,578,685	85.1	1,488,390	4.42
August.....	6,329,497	92.0	346,033	79.0	315,622	73.2	6,991,152	90.2	1,578,138	4.43
September.....	6,152,348	92.5	334,425	79.0	310,684	74.6	6,797,457	90.8	1,588,191	4.28
3rd Quarter.....	18,515,357	90.8	936,583	72.2	915,354	71.6	20,367,294	88.6	1,551,203	13.13
9 Months.....	56,843,453	93.8	3,114,284	80.8	2,748,114	72.4	62,705,851	91.9	1,607,842	39.00
October.....	6,831,984	99.3	384,272	87.8	353,896	82.1	7,570,152	97.7	1,708,838	4.43
November.....	6,543,390	98.2	360,620	85.0	338,417	81.0	7,242,427	96.5	1,688,211	4.29
December.....	6,654,966	96.9	373,367	85.5	347,308	80.7	7,375,641	95.4	1,668,697	4.42
4th Quarter.....	20,030,340	98.1	1,118,259	86.1	1,039,621	81.3	22,188,220	96.5	1,688,601	13.14
2nd 6 months.....	38,545,697	94.4	2,054,842	79.1	1,954,975	76.4	42,555,514	92.6	1,619,928	26.27
Total.....	76,873,793	94.9	4,232,543	82.1	3,787,735	74.6	84,894,071	93.0	1,628,195	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons Bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of January 1, 1947 as follows: Open hearth 81,010,990 net tons, Bessemer 5,154,000 net tons, Electric 5,076,240 net tons, total 91,241,230 net tons.

* Revised.
† Preliminary figures, subject to revision.

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Pilot Plant Produces Titanium Metal For Industrial Research

Wilmington, Del.

• • • Titanium metal manufacture is inching forward—slowly but surely. The DuPont Co. here has made a significant contribution to this progress. They have developed a pilot unit at their Newport plant which is currently producing 100 lb of titanium sponge metal daily.

Because so little is known about the physical properties of titanium, titanium alloys and their possible applications, DuPont is offering its product to universities and various research organizations free of charge in an effort to stimulate and speed up research work on this metal.

Although the Bureau of Mines developed a successful method for making titanium metal on a laboratory scale before the end of the war, DuPont has been the first to produce the metal on a commercial basis. In addition, the Bureau of Mines product is in powder form while DuPont is making sponge metal and will soon be producing ingots weighing up to 100 lb.

Both producers obtain the metal by chemical separation from ilmenite ores which exist in abundant supply in New York, Florida, Virginia, North Carolina and Canada. At present large quantities of this ore are imported from India, but resources here are now considered large enough that America will probably soon be independent of overseas sources.

Right now production costs are high and the price of \$5 per lb for titanium metal are prohibitive except for experimental purposes. But no phase of production can be considered a serious bottleneck to reducing costs substantially when and if plant operations are begun and a field of application has been developed for the metal. Despite the optimism that prevails concerning the present method, alternate metal separating techniques continue to be explored.

Significant is the fact that if an emergency were to arise where titanium metal was needed for specialty applications, substantial quantities could be provided satisfactorily by expanding the present method of production.

Besides investigating the prop-

erties of titanium itself, considerable work is being done to determine the effects of alloying elements on the properties of titanium. Scientists feel that when

all the data is correlated, titanium alloys will show as marked a superiority over titanium metal for certain applications as stainless steel does over iron.

Two Pipe Mills Ordered

Cleveland

• • • Yoder Co. has booked orders for two large pipe mills, a 16-in. mill for Page-Hersey Tubes Ltd., Ontario, Canada, and a 14-in. mill for Kaiser Steel Corp., Calif., according to John Lucas, Yoder Co. president. Both mills will be used to produce pipe for carrying natural gas and oil, he said.

The 16-in. mill for Page-Hersey will produce pipe from 4½ to 16-in. diam. with wall thickness up to ½ in. The initial contract

includes a leveler and side trimmer, shot blast, forming mill and a 15-kvs welder. Delivery is scheduled for June, 1949.

The 14-in. mill for Kaiser Steel Corp. will produce pipe from 4½ to 14 in. diam. with a maximum wall thickness of ¾ in. Delivery is scheduled for September, 1949.

Mr. Lucas said that each mill will require 40 tons of plate per hr when in operation producing an average 10-in. pipe. This is enough to produce about 3 miles of pipe each 8-hr day.

50 YEARS AGO

THE IRON AGE, September 22, 1898

• "It is probable that we are to see on a scale greater than heretofore, the consolidation of capital in industrial enterprises, and in no other field to such an extent as the metal industries. Permanency of control of great industries by large aggregations of capital is inevitable, all public agitation against 'trusts' to the contrary notwithstanding."

• "Acquisition of control of the ore of the Pioneer iron mine on the Vermillion range by the Carnegie-Oliver interests operating under the title of the Oliver Iron Mining Co., is the crowning event in the long series of negotiations which have been conducted by Henry W. Oliver of Pittsburgh."

• "A recent visit to the works of the Whiting Foundry Equipment Co., Harvey, Ill., found them well employed with bright prospects for the future. A growing business has obliged them to increase their facilities,

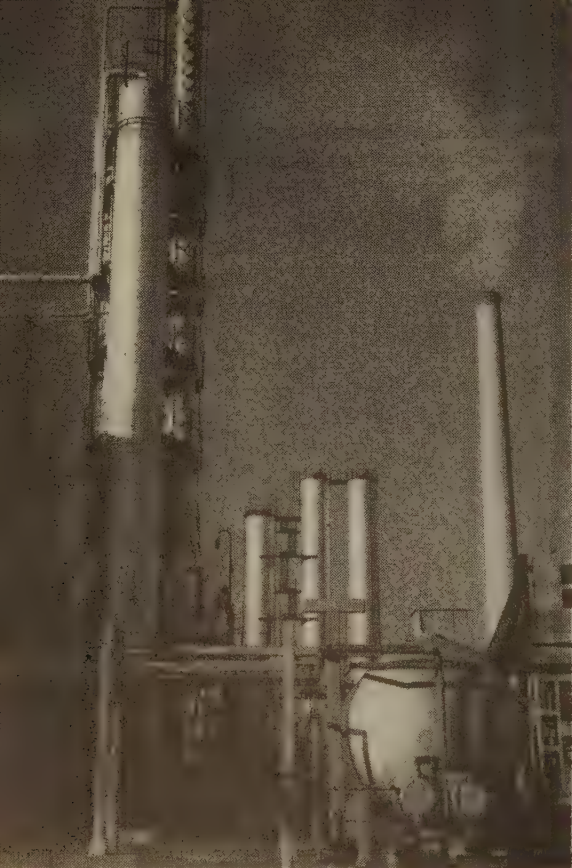
mainly in the way of machine tools. They are also finding pneumatic appliances steadily increasing in demand, the advantages of compressed air for transmission of power becoming more apparent, especially in foundry work."

• "Australian advices say that a great sensation has been created in that country with the finding of a gold nugget weighing 115 lb."

• "The Lewis Motorcycle Works of Chicago are building road wagons which will be driven by gas or vapor. It is claimed 100 miles per day can be made over good roads with 5½ gal. of gasoline. The wagon operates through a friction wheel which drives the machine forward or backward and may also be used as a brake."

• "Total loss of life of U. S. soldiers from combat in the Spanish conflict was 278 but the loss in death from disease was 1500."

*Progress at Volta Redonda Moves Brazil
Nearer to Self-Sufficiency in Steel Supply*



ABOVE

A modern coke by-product plant takes full advantage of waste gases from the coke ovens to produce benzol, coal tars, naphtha, toluene and ammonium sulphate fertilizers.



ABOVE

The 1200 ton blast furnace on which construction was started in 1943 and completed in June of 1946 produced 180,000 metric tons of pig iron during 1947, its first full year of operation.



ABOVE

One of the most modern of pig iron casting machines handles part of the blast furnace pig iron output while 4 150-ton openhearth furnaces, the last now nearing completion, use the rest as hot metal charge.

o o o

RIGHT

From this rail storage area was shipped some 22,000 tons of rails and rail accessories during 1947. Production tonnages of rails, shapes, plate and strip for the first half of 1948 are far above that of 1947 with structurals still the chief production items.



Volta Redonda Begins to Pay Off After Two Years of Operation

New York

• • • The steel boom is on at Volta Redonda. Finished steel sales for the 6 producing months of 1946 ran about \$5.6 million while the first full year's production for 1947 brought in almost \$14 million. Already during the first half of 1948 that figure has jumped to \$19 million.

These figures indicate the progress that is being made in the drive to make Brazil self sufficient in steel production and reduce imports to a minimum.

They have the facilities at Volta Redonda to achieve this goal. A 1200 ton blast furnace was blown in during June of 1946. It was constructed along with a coke plant which formed the nucleus for the mill as it is today.

The coke works has a battery of 55 ovens which produce 50 pct of the annual plant coke consumption and a modern by-products plant which yields benzol, coal tars, naphtha, toluene and ammonium sulphate fertilizers.

Today, the plant is a vision of modernization. To this beginning have been added a modern mechanical pig casting machine and four 150-ton openhearth furnaces, the last is now nearing completion, to handle the blast furnace output.

There are 8 soaking pits, 2 others being added, from which a 40-in. bloomer is fed. Two heating furnaces then reheat blooms, billets and slabs for rolling on the continuous rail, structural, plate, strip and finally temper pass mills.

In addition, the newest tinplate and galvanizing facilities in existence complete the production lines.

All this does not, however, round out the picture at Volta Redonda. A new foundry is being constructed which is expected to be in operation late this year. And, though it is only in the planning stage right now, a structural fabricating shop will be added in the near future.

Since Volta Redonda has its own coal mines, limestone quarries and ore mines (because of the distance to the rich Itabira fields their ore comes from nearby Lafayette), the plant presents a small model of complete integration.

Layout of the plant is perfect for expansion. In the early stages

Brazilian Mill Is Important Factor in Reduction of Country's Imports

By STEVE SMOKE
Associate Editor

of planning enough space was allotted to permit construction of 4 blast furnaces, 15 openhearth and finishing facilities without creating any space bottlenecks. In addition, present rolling mill capacity was built far in excess of melting capacity so that finished product capacity could be substantially increased with a minimum of capital investment by adding only necessary steelmaking capacity.

Background

• • • Late in 1940 the Brazilian government visualized a steel mill on a barren strip of land which today is Volta Redonda. They had little or no capital nor qualified personnel for such an undertaking. But they turned to the United States for help—in fact a lot of help—and they got it.

The Export-Import Bank granted them a \$45 million loan to which they have since added some 400 million cruzeiros or \$23 million to make a total capital investment of \$68 million.

They hired American personnel for key supervisory and maintenance positions. Today there are 43 men serving there in various capacities. Many of those hired have since been replaced, when their contracts expired, by young Brazilian engineers, but some have been retained in an advisory capacity.

In addition, all the machinery and materials used in construction of the plant came from the United States.

Actual production tonnages for the plant in 1947 were as follows:

PRODUCT	METRIC TONS
Pig iron	180,000
Ingots	150,000
Finished products:	
Structurals	40,000
Rails, etc.	22,000
Plates	18,000
Hot rolled strip	12,000
Cold rolled strip	3,000
Total, finished prods.	95,000

The goal for finished steel products for 1948 has been set at 200,000 tons. With production for the first 6 months at about 90,000 tons, it seems that the goal will be achieved.

In all probability the goal for 1949 will be set at about 300,000 tons of finished steel products, approximately the capacity of the present mill facilities. This tonnage together with the 150,000 tons annually from the Belgo-Maneira mill and 100,000 tons yearly from several smaller plants would provide about 550,000 tons of finished steel or just about the amount necessary to fill current Brazilian needs and reduce importing of normal steel products to a minimum except for tubing, wire and other products which they do not manufacture.

Brazil is not developing her steel industry with export in mind. But last year while rolling capacity was being built to take care of the steelmaking capacity, she did over-produce in pig iron. Argentina was only too glad to take care of the excess. As a result exports for the first half of 1948 were almost \$3.5 million. Commodities received in return there have been happily accepted. It is not improbable that as time goes by, Brazil, too, will share the benefits of having something hard to get and will do her best to make the most of it.

Recently Gen. Silvio Raulino de Oliveira, one of the men who visualized Volta Redonda 8 years ago and who is now president of the company, announced payment of a 6 pct dividend on the first 6 month sales for 1948. These dividends totaled almost \$4 million.

The Brazilian government was paid 57 pct of the dividends while the other 43 pct went to independent stockholders. However, 40 pct of the independent stockholders were government social groups, so in reality the government received 97 pct of the dividends and also completely controls Volta Redonda.

Having repaid \$1.4 million of the \$45 million loan from the Export-Import Bank, making payments regularly on the bank loan and having declared a substantial dividend indicates that the visions of 8 years ago have become a reality; that Brazil will soon be able to satisfy her own steel needs; that she will be able to repay her loan; and that a bright future looms for something that didn't exist 6 years ago.

J & L Buying Land To Add Openhearth At Pittsburgh Works

Pittsburgh

• • • Jones & Laughlin Steel Corp. has plans for an increase in openhearth capacity at Pittsburgh. It has been known for some time that the company was acquiring land adjacent to its South Side Pittsburgh works. Last week a company spokesman confirmed reports that additional facilities would be installed there, denied that new blast furnaces would be built on the site.

From reliable sources it is learned that plans may call for as many as 6 new openhearth at the South Side works. It was emphasized that the project is still in the planning stage and that it will be at least several years before it yields more openhearth steel for J & L in Pittsburgh.

The news caused surprise in some quarters in view of the problems posed to Pittsburgh steel-makers by f.o.b. selling and rising rail freight rates. It is believed, however, that the necessity of boosting openhearth output for better integration of the company's operations outweighs the f.o.b. and freight factors. J & L

has a substantial investment in the district and this action would increase its value by far more than the installation cost of the new equipment.

Some sources believe that the company's emphasis on sheets—which are made of openhearth steel—may lead to a reduction in bessemer output at the plant. Further, the entire South Side works is now overcrowded due to space limitations and gives the shop management a constant battle to maintain efficient operations.

The company's blast furnace modernization program will be sufficient to supply the additional hot metal for the new openhearth. No. 5 blast furnace, for instance, was taken off last week after making 4,326,913 net tons of iron on its present hearth and bosh. Its 20-ft diam. hearth will be replaced with a 24-ft hearth. Full scale operation of the coal washer at the Vesta mines will increase metallurgical coal quality and further boost pig iron output.

Fairless Asserts That F.O.B. and Rail Rates Threaten Pittsburgh

Pittsburgh

• • • "A challenge to Pittsburgh's industrial well-being," is what Benjamin F. Fairless calls the enforced change to f.o.b. steel marketing. The U. S. Steel Corp. president reiterated his position on the narrowing of selling markets by government decree at the annual meeting of the Allegheny Conference on Community Development here last week.

The steel industry grew in the

Pittsburgh area in the past decades, he said, because of the natural advantages it offered in the assembling of raw materials for the industry. The cost of transporting the district's steel products to distant markets was tolerable then, he added.

The building of other steel mills between Pittsburgh and some of the more desirable steel-consuming areas placed these mills in an attractive competitive position, Mr. Fairless pointed out. Then he launched into one of his favorite topics: rail rates. He asserted that, step by step, the spread between the rates from Pittsburgh and those from points nearer to the markets has increased. "The more distant shipper is thereby often practically debarred from serving certain districts."

The transportation problem combined with enforced f.o.b. mill sales means that the Pittsburgh industrial region is faced with the necessity of attracting more steel fabricators to the district, Mr. Fairless declared. He added that "since there are advantages to be gained by those fabricators who locate their operations close to a source of supply the task of enlarging the Pittsburgh market for capital goods may now be less difficult than heretofore. The reward of persistent and effective effort in that direction could be two-fold, that is, a desirable addition to the total industrial activity of the region, and a firmer grasp upon a position of undiminished prominence in the production of steel."

Coming Events

- Sept. 28-Oct. 1 Assn. of Iron & Steel Engineers, Convention and Iron and Steel Exposition, Cleveland.
- Oct. 4-7 American Institute of Steel Construction, annual convention, Quebec, Canada.
- Oct. 5-7 Industrial Packaging Engineers Assn., Industrial Packaging and Materials Handling Exposition, Chicago.
- Oct. 5-9 Concrete Reinforcing Steel Institute, semiannual meeting, Asheville, N. C.
- Oct. 6-9 Society of Automotive Engineers, national aeronautic meeting, Los Angeles.
- Oct. 11-13 National Lubricating Grease Institute, annual convention, Chicago.
- Oct. 11-13 American Society Tool Engineers, semiannual meeting, Los Angeles.
- Oct. 13-15 Porcelain Enamel Institute, annual forum, Urbana, Ill.
- Oct. 14-15 Gray Iron Founders' Society, annual meeting, Atlantic City.
- Oct. 18-20 National Metal Trades Assn., annual convention, New York.
- Oct. 18-22 National Safety Congress and Exposition, Chicago.
- Oct. 22-25 Metal Treating Institute, annual meeting, Philadelphia.
- Oct. 23-29 American Society for Metals, annual convention, Philadelphia.
- Oct. 24-29 American Welding Society, annual meeting, Philadelphia.
- Oct. 25-27 American Institute of Mining and Metallurgical Engineers, Metals Div., fall meeting, Philadelphia.
- Oct. 25-27 American Gear Manufacturers Assn., fall meeting, Chicago.
- Oct. 25-29 National Metal Exposition, Philadelphia.
- Oct. 27-28 Society for Nondestructive Testing, annual convention, Philadelphia.
- Nov. 4-6 National Electronics Conference, Chicago.
- Nov. 14-17 National Tool & Die Manufacturers Assn., annual meeting, Milwaukee.

Weekly Gallup Polls . . .

Poll Shows Dewey Leading as Election Campaigns Start

Princeton, N. J.

••• As the presidential campaign enters its fireworks stage eight weeks from election day, the national standing of the principal candidates is as follows: Dewey, first with 48½ pct of the votes; Truman, 36½ pct; Wallace, 5 pct; while the remaining 10 pct are undecided, according to George Gallup, director, American Institute of Public Opinion.

Gov. J. Strom Thurmond, candidate of the Southern States' Rights Party, polls slightly less than 2 pct nationally, but his party's ticket is not expected to be on the official election ballot in more than a small number of the 48 states.

President Truman's campaign opened up vigorously. Gov. Dewey has also promised a rugged campaign, and Henry A. Wallace has conducted an eventful tour of the South.

The trend of sentiment thus far among voters who have expressed a preference for one candidate or another is shown below. It can be seen that there has been very little change up to this point in the campaign.

With Undecideds Eliminated

	June	Aug.	To-
	Pct.	Pct.	day
Dewey	53	53	54
Truman	41	41	40½
Wallace	6	6	5½

Democratic leaders have been cheered by a number of recent events which they believe will strengthen their ticket. Organized labor has swung into line behind the Truman forces. The Wallace ticket has been barred from the Illinois ballot, by order of the State Election Board, and Democrats feel that this improves Mr. Truman's chances of carrying that important State. Finally, supporters of the Truman-Barkley ticket have begun counterattacks against the Dixiecrats in South Carolina, Alabama and Mississippi whose electoral votes at present are pledged to Mr. Thurmond.

How well the Democrats do in November will depend to a very large extent on turnout. Fresh evidence of the importance of the turnout factor comes from today's survey. If everybody were required by law to vote, as in Australia or in Holland, 1948 would be a horse-race between Governor Dewey and Mr. Truman.

Usually the turnout in presidential elections amounts to about one-half to three-fifths of the potential voting population. In mid-term Congressional elections it is much lower, sometimes under one-third. Because the stay-at-homes are predominately Democratic in their political sentiments, a small turnout hurts the Democratic party.

Among the total potential voting population of 94,000,000 (all persons 21 years of age and over) here is how the candidates stand today:

If Everybody Voted	
	Pct.
Dewey	49
Truman	45½
Wallace	5½

The Thurmond vote nationally on this basis is 4½ pct.

As turnout drops from the theoretical potential of 94,000,000 to the 58,000,000 figure which is likely in November, President Truman's percentage drops. To the extent that the turnout is less than 58,000,000 the Democrats will suffer even more. The 58,000,000 figure is what the turnout will be if the same proportion of people go to the polls as did in 1940, the last election before the war.

The Democratic Party has already begun concentrating on getting out a big vote. Only last week President Truman expressed the hope that every eligible voter and "not just the customary minority of those eligible" will go to the polls.

••• Men and women rarely show much difference in political senti-

Analysis of National Polls Reveals Women's Vote Equals Male in Presidential Choice

o o o

ment in national elections and this year there is even less disagreement between the sexes than during previous presidential races. In fact, the candidate preferences of men and women voters today are almost identical, as the following poll shows:

"If the presidential election were being held TODAY how would you vote—for Truman, for Dewey or for Wallace?"

The preferences of men and women line up as follows:

	Men Pct.	Women Pct.
Dewey	49	48
Truman	36½	36½
Wallace	5	5
Undecided	9½	10½

The above results, together with similar findings in earlier election years, raise the question whether there is any distinct women's viewpoint or petticoat vote in national politics that is different from the male vote.

Past experience has shown that even when opinion differences do exist between men and women early in a presidential campaign the difference tends to be reduced as election day approaches. Only on rare occasions has it amounted to more than about two percentage points. This year the difference is statistically negligible two full months before election day.

Much more noticeable differences in presidential preferences generally are provided by age than are by sex. But as things stand today, the 1948 campaign is unique in this respect also, in that variations from one age bracket to the next

(CONTINUED ON PAGE 164)

Construction Steel . . .

• • • Fabricated steel awards this week included the following:

- 1765 Tons, Philadelphia, extension to Market St. subway. City of Philadelphia, through Golder Construction Co., Philadelphia, to Bethlehem Steel Co., Bethlehem.
- 1600 Tons, Milwaukee, cupola and foundry building for Bucyrus Erie Co. to Warden Allen Co.
- 1165 Tons, Oakland, Calif., railroad undercrossings, highway overcrossings, etc., East Shore Freeway between 50th Ave. and 38th Ave., through Johnson, Drake & Piper, to Consolidated Western Steel Corp.
- 900 Tons, Evansville, Ind., manufacturing bldg. for Bucyrus Erie Co. to International Steel Co., Evansville, Ind.
- 680 Tons, Los Angeles Co., Calif., Firestone Blvd. bridge, South Gate, through Wonderly Construction Co. to South West Steel Rolling Mills.
- 550 Tons, Hungry Horse Project, Mont., two traveling cranes and one set of lifting beams for Hungry Horse powerplant, Bureau of Reclamation, Spec. 2270, to Manning, Maxwell & Moore, Muskegon, Mich.
- 320 Tons, Nashville, Tenn., warehouse for Moore-Handley Hardware Co., to Southern Steel Works Co., Birmingham.
- 320 Tons, Piatt Co., Illinois, State highway bridge Section 11X-F to Illinois Steel Bridge Co., Jacksonville, Ill.
- 170 Tons, Tazell Co., Ill., state highway bridge Section 8F to Illinois Steel Bridge Co., Jacksonville, Ill.
- 170 Tons, South Bend, Ind., bottling plant for Coca-Cola Bottling Co. to American Bridge Co., Pittsburgh.
- 150 Tons, Clark Co., Wis., state highway bridge Section S040-2 through Eau Claire Engineering Co. to Bethlehem Steel Co., Inc., Bethlehem, Pa.
- 140 Tons, Vilas Co., Wis., state highway bridge Section T-024-1-1 to American Bridge Co., Pittsburgh.
- 100 Tons, Racine Co., Ill., state highway bridge Section T-014-3-1 to Lakeside Bridge & Steel Co., Milwaukee.
- 100 Tons, Johnsville, Pa., addition to human centrifuge building for Navy Dept., Philadelphia Navy Yard, through Ralph S. Herzog, Philadelphia, to American Bridge Co., Pittsburgh.

• • • Fabricated steel inquiries this week included the following:

- 4600 Tons, Cincinnati, Ohio, Sixth Ave. viaduct.
- 4000 Tons, Somerset, Ky., railroad bridge for the Southern Rwy. Co.
- 2680 Tons, Garrison Dam, North Dakota, tunnel liners through U. S. Engineers. Bids due Oct. 17.
- 1560 Tons, Kitsap Co., Wash., Agate Pass Bridge, Director of Highways, Olympia. Bids to Oct. 1.
- 1236 Tons, Roseville, Calif., overcrossings at Vernon St. and at Atlantic St., Calif., Div. of Highways, Sacramento. Bids to Oct. 13.
- 1165 Tons, Elsmere, Del., overpass, Delaware Dept. of Highways, J. A. Bader Co., Wilmington, Del., low bidder.
- 1000 Tons, Michigan City, Ind., powerhouse for Northern Indiana Public Service Co.
- 420 Tons, Des Moines, Iowa, Fifth Street bridge State of Iowa. Bids due Sept. 26.
- 350 Tons, York Co., Pa., two bridges for Pennsylvania Turnpike Comm. Due Sept. 24.
- 210 Tons, Tehama Co., Calif., bridges and approaches across Reeds Creek, Paynes Creek and Thomes Creek, Calif., Div. of Highways, Sacramento. Bids to Oct. 6.

• • • Reinforcing bar awards this week included the following:

- 800 Tons, Nobelsville, Ind., power station through Gus Newberg Construction Co. to Bethlehem Steel Co. Inc., Bethlehem.
- 460 Tons, Oakland, Calif., railroad undercrossings, highway overcrossings, etc., East Shore Freeway between 50th Ave.

and 38th Ave., through Johnson, Drake & Piper, to Daco Development Co.

- 210 Tons, Los Angeles overcrossing on Hollywood Parkway at Spring St., through Oberg Bros., to Bethlehem Steel Co., Inc., Bethlehem.
- 190 Tons, Los Angeles Co., Calif., Firestone Blvd. bridge, South Gate, and river channel improvement, through Wonderly Construction Co., to Union Steel Co.
- 100 Tons, Fort Hamilton, Brooklyn, residence buildings at Veterans Hospital, through John Rosenblum, Inc., New York, to Capitol Steel Corp. of N. Y.

• • • Reinforcing bar inquiries this week included the following:

- 18650 Tons, Coulee Dam, Wash., Soap Lake Siphon, West Canal, Columbia Basin Project, Bureau of Reclamation, Spec. 2411. Bids to Oct. 19.
- 820 Tons, Denver, highway construction and structures, Highways 185 and 72, State Highway Dept., Denver. Bids to Oct. 8.
- 500 Tons, Roseville, Calif., overcrossings at Vernon St. and at Atlantic St., Calif., Div. of Highways, Sacramento. Bids to Oct. 13.
- 425 Tons, Kitsap Co., Wash., approaches to Agate Pass Bridge, Director of Highways, Olympia. Bids to Oct. 1.
- 300 Tons, Chicago warehouse for the Illinois Bell Telephone Co. Bids close Sept. 31.
- 120 Tons, Cowlitz Co., Wash., Ostrander Creek bridge, Director of Highways, Olympia. Bids to Sept. 24.
- 100 Tons, Tehama Co., Calif., bridges and approaches across Reeds Creek, Paynes Creek and Thomes Creek, Calif., Div. of Highways, Sacramento. Bids to Oct. 6.

Eastern Pennsylvania Scrap Market Tested As New Factor Bids

Philadelphia

• • • A new factor entered the eastern Pennsylvania scrap market last week whose buying is expected to add some strength to Philadelphia market prices. The Penn-Ohio Steel Corp., Birdsboro, Pa., began buying heavy melting and blast furnace grades in Philadelphia and Allentown through M. Cohen & Son, Cleveland broker, at prices above those being paid by other consumers in the district.

According to reliable sources, this consumer is offering \$44.00 for No. 1 heavy melting and \$40.50 for No. 2, both f.o.b. Philadelphia. At Allentown, this buyer is reported to be offering dealers \$46.00 for No. 1 melting, \$42.50 for No. 2, and \$38.50 for machine shop turnings, all f.o.b. Allentown. When the freight rate of close to \$3.00 to Birdsboro from each of these points is added to these prices, they are seen to be well above prevailing Philadelphia delivered-to-consumer prices. It is understood that the Allentown prices have been set well above the Philadelphia prices so

Lease Legality Suit

Washington

• • • The Wheland Co., Chattanooga, Tenn., Foundry, has filed suit in federal district court against Jess Larson, War Assets Administrator.

Suit charges that Mr. Larson violated the surplus property act of 1944 and WAA regulations in leasing the government-owned blast furnace in Cleveland to Kaiser-Frazer Corp.

Arnold, Fortas and Porter, attorneys for Wheland, have asked the courts to declare Mr. Larson's acts illegal, set aside the Kaiser-Frazer lease and direct WAA to "offer the property legally and properly for purchase or lease to all interested parties or possible bidders."

Wheland contends that (1) Mr. Larson did not give proper public notice of availability of the property for sale and (2) that Mr. Larson gave Kaiser an "exclusive inside tip" of such availability.

as to draw off scrap going to Bethlehem Steel Co. at Bethlehem, which is now reported to be paying \$41.50 delivered for No. 2.

Kaiser-Republic Furnace Controversy Flares Again

Cleveland

• • • A shrewd bid by Henry J. Kaiser for the good will and perhaps the backing of foundries and other customers whose sources of pig iron had been threatened as a result of the lease of the government-owned blast furnace here to Kaiser-Frazer Corp., opened up a new front in the KF-Republic Steel Corp. battle.

In a telegram to President Truman, Mr. Kaiser, chairman of the board of K-F, proposed that foundrymen and other customers dependent upon Republic for pig iron form a cooperative company to lease or build their own blast furnace with the help of the Kaiser organization, if desired.

Mr. Kaiser also proposed to the Gray Iron Founders Society the expansion of the blast furnace here to supply iron "without any profit to us" to a cooperative company formed by the foundrymen.

Raymond L. Collier, executive vice-president of Gray Iron Founders and an important witness for Republic at the hearings in Washington last month, said he would poll his membership on the Kaiser proposal.

Change in Method Of Pricing Ferroalloys Slated for Oct. 1st

New York

•••There will be a complete change in the method of pricing most ferroalloys on Oct. 1 when the new price schedule of Electro Metallurgical Sales Corp. goes into effect. The new schedule establishes a single price for each alloy for delivery anywhere in the United States, in contrast to the former zone delivered system by which western and central area consumers paid higher base prices than eastern consumers.

From that date on, every customer of the company, regardless of location, will be able to buy most ferroalloy products at a uniform price. Since most eastern producers of ferroalloys sell on the basis of freight allowance to the equivalent of the St. Louis, Mo. rate, the change announced by Electro Metallurgical Sales Corp. is not expected to affect their sales practices. But other producers are busy now readjusting their price schedules. The change in pricing method affects all the ferroalloy products made by the company except standard ferromanganese and 15 pct ferrosilicon, sold f.o.b. producing points or stock points.

The new base price for 50 pct ferrosilicon becomes 10.5c per lb of contained silicon. Specific increases in other grades of ferrosilicon are as follows: Low-aluminum 50 pct ferrosilicon is up 1.2c a lb; 65 pct ferrosilicon up 1.4c a lb; 75 pct ferrosilicon up 1.2c a lb; 85 pct ferrosilicon up 1.35c a lb; 90 pct ferrosilicon up 1.5c a lb; silicon metal up 1.7c a lb. Ground 15 pct ferrosilicon is raised \$6 a gross ton and will continue to be sold f.o.b. producing point at Niagara Falls, N. Y.

Standard ferromanganese, which is sold f.o.b. producing or stock point, is raised from \$145 to \$160 a gross ton. Low-carbon ferromanganese is raised 2.25c a lb of contained manganese; medium-carbon ferromanganese up 1.65c; low-iron ferromanganese up 1.35c; and manganese metal up 3c per lb of metal. Silicomanganese is increased 0.8c per lb of alloy.

High-carbon ferrochrome alloys are increased 1.9c per lb of contained chromium. Low-carbon ferrochrome, in grades from max. 0.03 pct carbon to max. 0.10 pct carbon, is increased 2.25c per lb of contained chromium. The max. 0.15 pct, 0.20 pct, and 0.50 pct carbon grades are raised 2.5c. The max. 1 and 2 pct carbon grades are raised 2.75c. All grades of chromium metal are up 10c a lb of contained chromium.

Increases in the prices of briquetted alloys used by foundries are as follows: Silicon briquets are up 0.65c per lb of briquet; chromium briquets up 1.25c; ferromanganese briquets up 1.3c; and silicomanganese briquets up 1.25c.

Increases of about 10 pct also apply to the zirconium alloys, the calcium alloys, ferrocolumbium, and other special alloys.

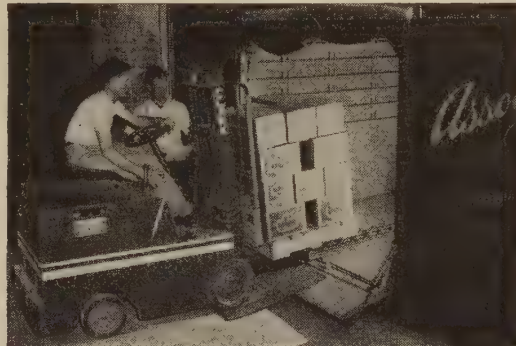
Prices of the vanadium and tungsten alloys remain unchanged.

There are no changes in packing, quantity, sizing, and spot differentials for any products.

MATERIAL HANDLING News



Orderly tiering of palletized cartons to the ceiling or cold storage rooms is routine for the Elec-Clipper



Unloading material from a delivery truck with the Elec-Clipper cuts the truck's standing time, simplifies checking of shipments, speeds the movement of material



Hustling unit loads from the warehouse and quick assembly of shipments by means of the Elec-Clipper cut handling costs to the minimum

"King's size for usefulness, Pint-size in cost"

ELEC-CLIPPER

is the versatile electric battery-powered fork truck for that multitude of handling jobs defined as "loads up to 2,000 pounds"

Potent combination of versatile utility and attractively small cost, Clark's Elec-Clipper has done an exceptional job for industry in handling materials weighing up to a ton. In the many branches of the food industry, and particularly in wholesale distribution outlets; in foundries and metal working shops, automobile plants, railway storehouses and freight depots; in truckers' freight stations and warehouses of all kinds; in all these and many other varied installations, electric battery-powered Clark Clippers enjoy admiration and respect.

With 124-inch lift on the standard high-lift model, and over-all height of only 83 inches with forks lowered, the Elec-Clipper moves comfortably and safely under 7-foot clearances, and does high tiering with amazing ease.

Finally, it costs less—a clinching benefit: less in initial investment, less to maintain, less to operate—by testimony of delighted users. That benefit is a natural result of Clark's unrivaled automotive experience and of Clark's own quantity production of nearly all component parts. It's a better machine—husky, dependable, economical—because Clark builds it.

To get a wholly objective survey of materials handling operations and needs in your business, talk to a Clark field representative—a competent man whose recommendations are unbiased because Clark builds both types of machine, gas-powered and electric battery-powered. As basic "good business" CONSULT CLARK.

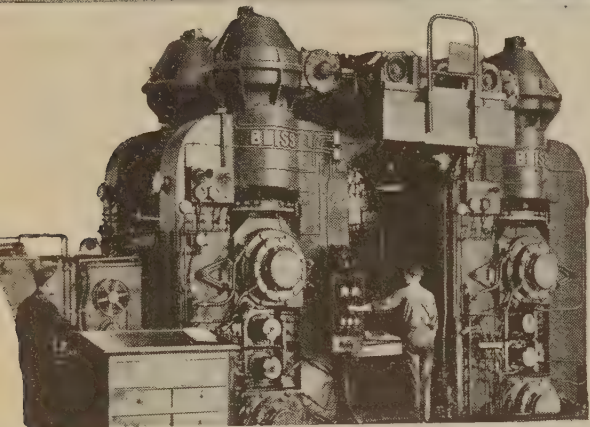
CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS



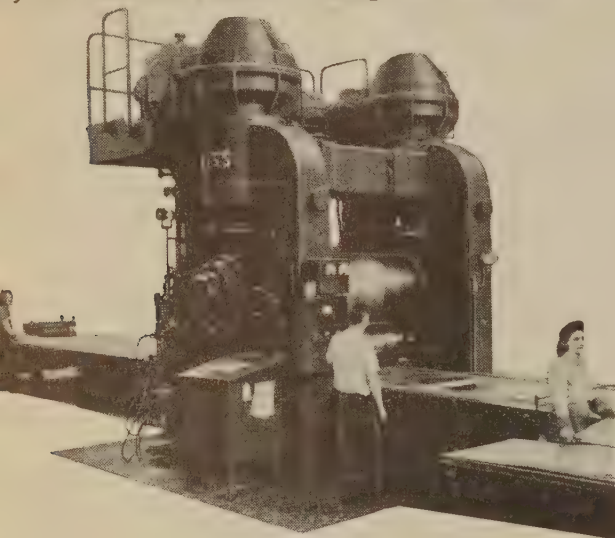
INDUSTRIAL TRUCK DIV., CLARK EQUIPMENT COMPANY BATTLE CREEK 31, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

The National Guard Defends America—Join Now

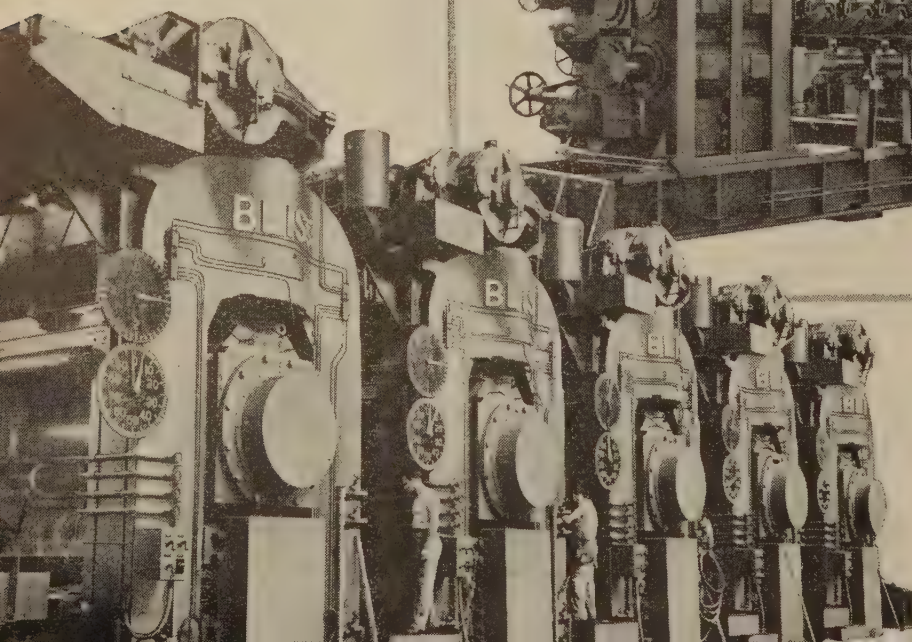
In Rolling Mills, too,



BRASS—16" x 34" x 34" two stand tandem four-high mill is one of many Bliss installations used for breaking down brass slabs.



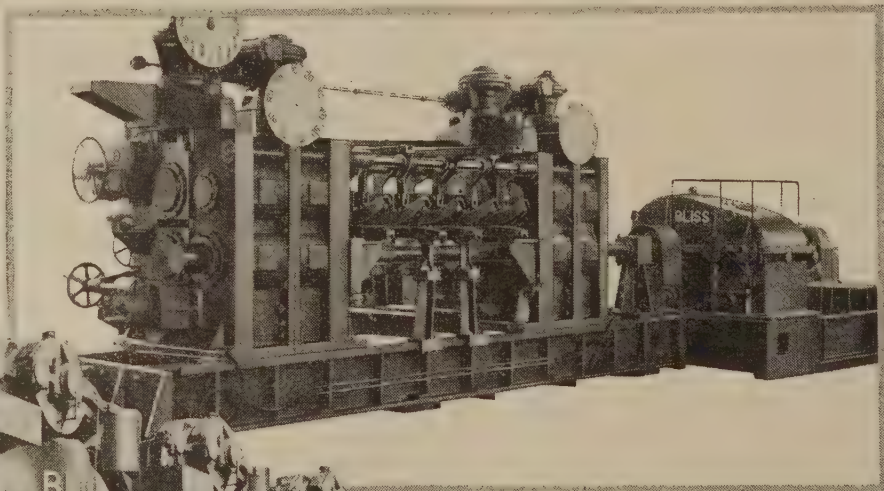
MAGNESIUM—16" x 33" x 72" single stand four-high mill is used to reduce thickness of magnesium sheets.



Hundreds of outstanding Bliss sheet and strip mill installations—here and abroad—give daily evidence of the close cooperation between customer and builder which alone can create a mill exactly suited to the job at hand.

Whether your requirements concern 2-, 3-, 4-high or cluster mills; hot or cold-rolling of ferrous or non-ferrous metals, Bliss can supply the equipment especially designed to suit *your* needs. Bliss also builds an extensive variety of accessories: mandrel type hot mill coilers, up-coilers, slitters, etc. Some of this equipment are illustrated on these pages.

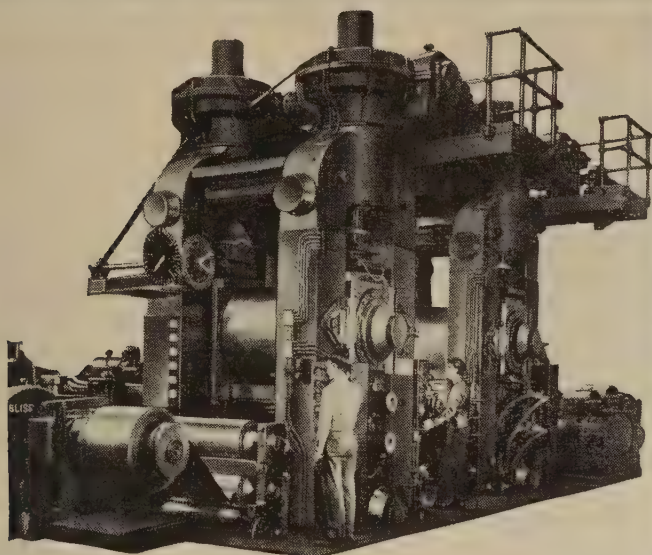
Put your rolling mill problem up to Bliss. You'll find the same keen engineering counsel and service which have made Bliss the first name in presses for more than 90 years.



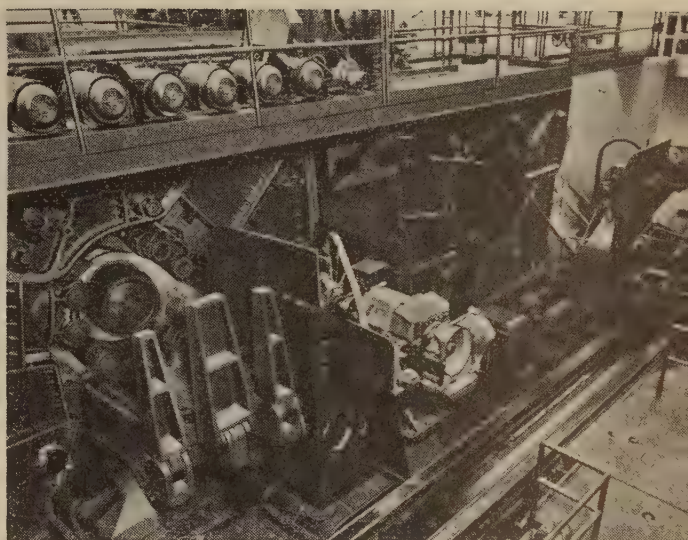
ALUMINUM—Heavy duty rotary trimmer and scrap cutter used by aluminum industry for trimming the sheet off the hot mill.

ALUMINUM—26" x 55" x 80" five stand continuous finishing train of a hot strip mill for aluminum.

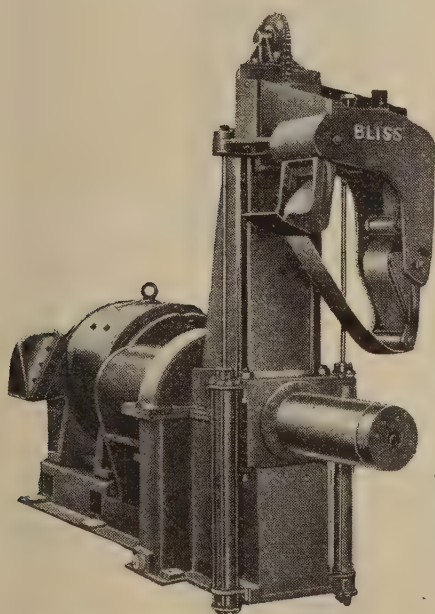
Stay Ahead with Bliss



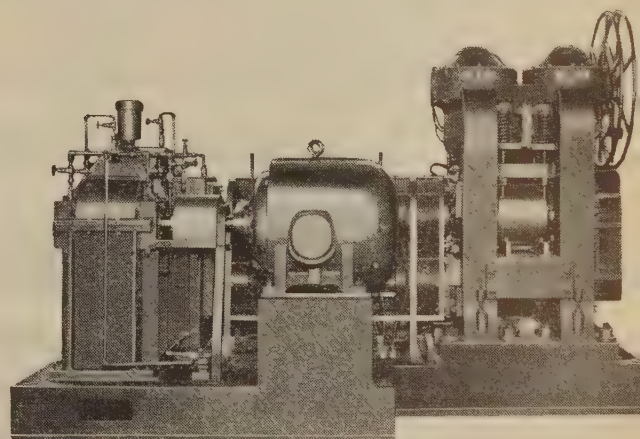
TIN PLATE—18" x 42½" x 42" two stand tandem temper pass mill for tin plate.



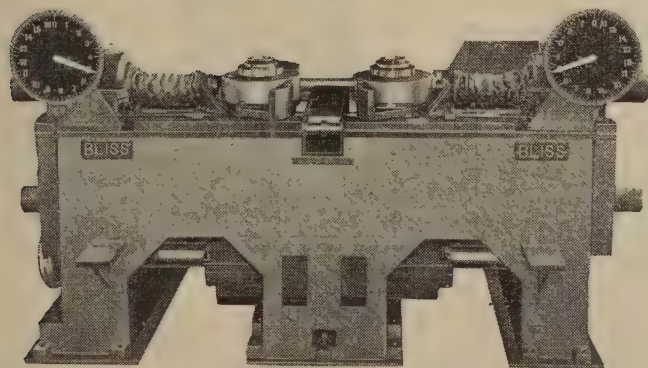
STEEL—Improved type hot strip downcoiler and upender for a Bliss 48" continuous strip mill.



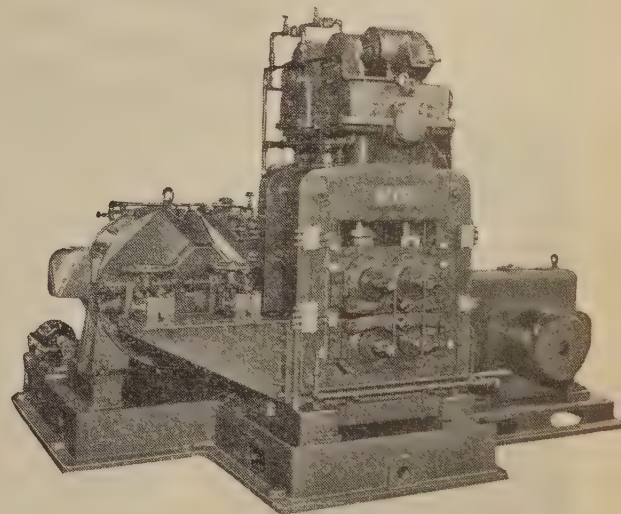
ACCESSORY—12" x 18" tension reel with vertical type belt wrapper has application in ferrous and non-ferrous fields.



COIN METAL—14" x 12" two-high mill used in government mints typical of smaller Bliss mills.



ACCESSORY—20" Vertical edger for edging 8" to 40" wide slabs.



THIN GAGE METALS—3¼" x 9" x 8" Cluster Mill for cold reduction of high carbon alloy and stainless steels from gages of .125" to .004"

E. W. BLISS COMPANY

450 AMSTERDAM AVENUE, DETROIT 2, MICHIGAN

STAY AHEAD
WITH *Bliss*

This is how STROM BALLS are born



A heading machine cutting sections from heated steel rods and compressing them in a die to a rough spherical shape.

The steel is carefully chosen and inspected, even before it gets to the heading machine. After being "born" here, balls are carefully "brought up," through a long series of grinding and lapping operations, to the unbelievably high standards of finish, sphericity and precision which have made Strom Metal Balls the standard of Industry. Strom Steel Ball Co., 1850 South 54th Avenue, Cicero 50, Illinois.

Strom BALLS Serve Industry

Largest Independent and Exclusive Metal Ball Manufacturer

McDANEL High Temperature COMBUSTION TUBES



for use in
Metallurgical Laboratories

OTHER McDANEL PRODUCTS

High Temperature
Combustion Tubes.

Self-cooling Com-
bustion Tubes.

Refractory Porce-
lain Specialties in
stock or designed to
meet specific needs.

Specify McDanel
High Temperature
Combustion Tubes
from your supplier.

McDanel Combustion Tubes are precision made under rigid laboratory control to assure proper density, accurate bore size, wall thickness, etc. They have a low coefficient of expansion and maximum resistance to thermal shock and abrasion. Now giving outstanding service in metallurgical laboratories throughout the country. McDanel Combustion Tubes are carefully ground for stopper thickness.

Straight, tapered or double
reduced self-cooling ends.

Write for catalog

McDanel Refractory Porcelain Co.
Beaver Falls ··· Penna.

New Officers Named For Potter & Johnston Co.

Pawtucket, R. I.



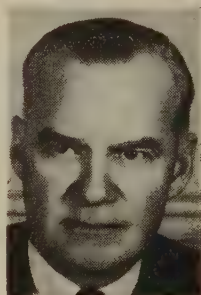
E. P. Gillane

• • • C. R. Burt, president of Potter & Johnston Co., Pawtucket, R. I., announced recently the newly elected officers of this subsidiary of Pratt & Whitney Div. of Niles-Bement-Pond Co., West Hartford, Conn. Potter & Johnston Machine Co. was acquired by Pratt & Whitney in March 1948 and the corporate name was changed to Potter & Johnston Co. At that time, Mr. Burt resigned as chairman of the board of Pratt & Whitney Div. to head the new subsidiary.



J. Earle Makant

The new officers of the Potter & Johnston Co. include: E. P. Gillane, vice-president and controller; J. Earle Makant, vice-president and factory manager;



J. P. Cunningham

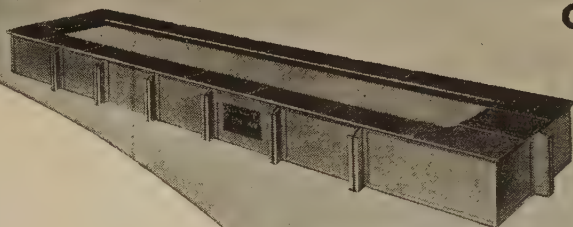
J. Potter Cunningham, vice-president and sales manager; R. W. Banfield, secretary and treasurer; and Carl A. G. Birke-dal, assistant secretary and treasurer. Several of the new officers had previously been associated with the Potter & Johnston Machine Co., before it became a P&W subsidiary.

To Head Engineers

San Francisco

• • • Roger D. McCoy, West Coast consulting engineer, has been elected as first permanent president of the Bay Area Chapter of the California Society of Professional Engineers.

**THERE IS A SUNBEAM STEWART INDUSTRIAL FURNACE FOR EVERY NEED
GAS • ELECTRIC • OIL**



GALVANIZING

Sunbeam **STEWART**

THE BEST INDUSTRIAL FURNACES MADE

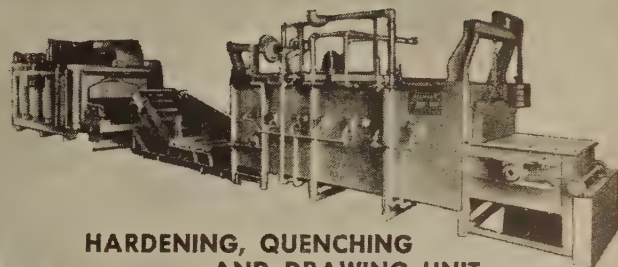
- **Longer furnace life • Greater production**
- **Lower operating cost**

As a division of Sunbeam Corporation we have the opportunity of working with our furnaces in the production of Sunbeam appliances, lawn sprinklers, sheep shears, animal clippers, etc. In manufacturing our own products we must contend with practically every heat treating problem faced by industry—a position unique in the furnace manufacturing field.

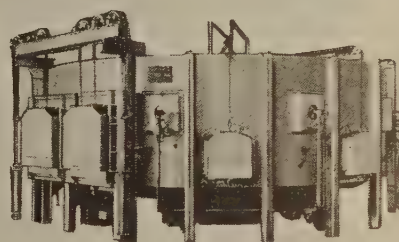
This experience with our own furnaces in large volume production enables us to render a service to you far beyond other manufacturers. That is one reason why Sunbeam Stewart Furnace installations have been so successful. They are based not only on furnace engineering ability, but on practical experience under actual operating conditions. We have learned through actual experience the factors that give longest furnace life... greatest production... best quality... and lowest operating cost.

Our highly trained technical staff of furnace engineers who for over 50 years have built furnaces for the leading companies throughout the United States and abroad are qualified to recommend the correct type of furnace to meet your requirements.

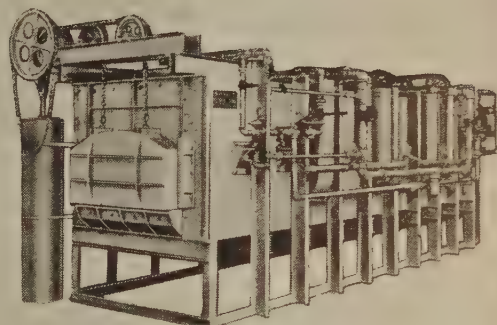
A letter, wire or 'phone call will promptly bring you information and details on Sunbeam Stewart Furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a Sunbeam Stewart engineer will be glad to call and discuss your heat treating problem.



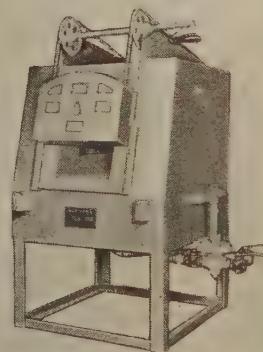
**HARDENING, QUENCHING
AND DRAWING UNIT**



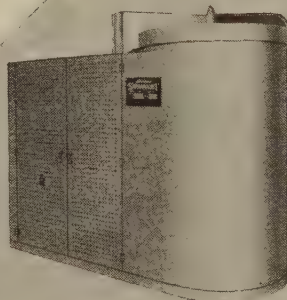
ROTARY HEARTH FORGE



PORTABLE OVEN FURNACE



**SEMI-MUFFLE AND FULL MUFFLE
OVENS**



**RECIRCULATING
FURNACES**

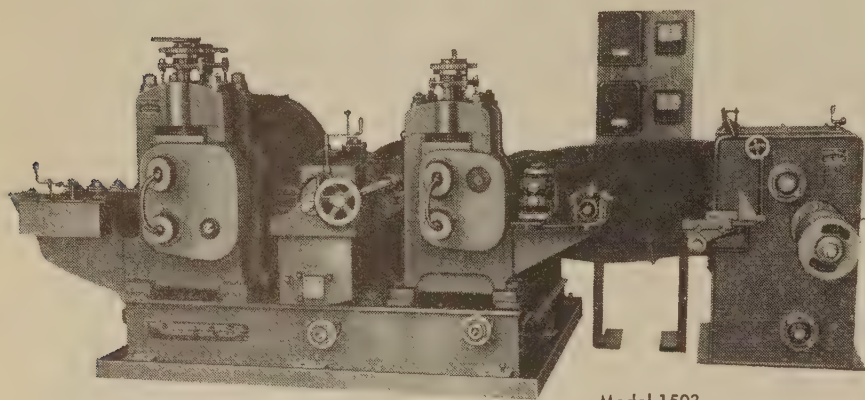
SUNBEAM STEWART INDUSTRIAL FURNACE DIVISION of SUNBEAM CORPORATION

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Main Office: Dept. 110, 4433 Ogden Ave., Chicago 23—New York Office: 322 W. 48th St., New York 19—Detroit Office: 3409 E. Grand Blvd., Detroit 2
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with speed and accuracy
in a Single Pass...

CONVERT ROUND WIRE to *Flat, Square, Rectangular*



Model 1503
Torrington Tandem Flat
Wire Mill with winder.

WITH TORRINGTON FLAT WIRE MILLS

In Torrington Flat Wire Mills, non-ferrous wire or rod passes successively through horizontal breakdown rolls, grooved edging rolls, final horizontal finishing rolls, and to the winder through magnetic gauges with easy-to-read dial indicators. Precision production to thickness tolerances as exacting as .00025" and .001" width is possible — with speed and economy.

With these flat wire mills you benefit from Torrington's 60 years' experience in designing and building auxiliary mill equipment. Write us, describing in detail your requirements.

The **TORRINGTON**
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

Record Attendance Seen At A.I.S.C. Convention

Quebec

... Advance registrations for the 26th Annual A.I.S.C. Convention at Chateau Frontenac, Quebec, Canada, has passed the 600 mark, assuring an all-time record. Over 100 guests from the Canadian Institute of Steel Construction will be present.

From the moment when President T. R. Mullen bangs the gavel for the opening session on Monday, Oct. 4, until the close of the last business meeting on Thursday afternoon, Oct. 7, days and evenings will be crowded with interesting programs.

The convention will be addressed by top-flight speakers. Enjoyable social programs have been arranged, including golf, bridge, tours of the quaint old-world city of Quebec and a voyage on the St. Lawrence River.

For those planning to attend the convention, points to remember at the international border are: Ordinary baggage enters duty free. Cameras, radios, golf and other sports equipment must be registered when baggage is inspected. One quart (40 oz.) of liquor and 200 cigarettes per person will be admitted duty free. No extra liquor may be taken in. Extra cigarettes are subject to customs duty. Six rolls of photographic film may enter duty free; duty is charged on additional film. Sufficient gas and oil for 300 miles travel may be taken in with each auto.

Following is the convention program:

MONDAY—October 4

Morning Session

9:00 A.M. Registration

10:00 A.M. Invocation

Msgr. Ferdinand Vandry
Rector of Laval University,
Quebec

Address of Welcome. Lucien Borne
Mayor of Quebec

President's Annual Address

Reading of Minutes of the Last
Annual Meeting

Address—The Washington Scene
Walter Chamblin, Jr.,
Vice-President, N.A.M.

Report of Treasurer

Report of Secretary

Announcement of Committee Ap-
pointments

Afternoon Session

2:30 P.M. Sightseeing Boat Trip on St.
Lawrence River

Evening Session

6:30 P.M. President's Reception

7:30 P.M. Get-together Dinner

TUESDAY—October 5
(CANADIAN DAY)

Morning Session

10:00 A.M. Greetings from the Canadian Institute of Steel Construction
G. E. Treloar, President
Address.... Maurice L. Duplessis
Prime Minister of the Province of Quebec
Discussion

Afternoon Session

1:00 P.M. Golf Tournament—Royal Quebec Golf Club
Golf Chairman, L. C. Anderson
2:00 P.M. Ladies' Bridge Party
Manoir Saint Castin,
Lac Beauport

Evening Session

Motion Pictures

WEDNESDAY—October 6

Morning Session

9:30 A.M. Address—"Canadian Trends in Structural Steel Design"
Robert S. Eadie
Chief Engineer, Dominion Bridge Company
Report of Director of Engineering
Report of Chief Engineer
Committee Reports

Afternoon Session

2:30 P.M. Engineering Symposium—
Discussion
3:00 P.M. Tea and Fashion Show (Ladies)
Staged by Holt, Renfrew & Co., Ltd.

Evening Session

7:30 P.M. Annual Banquet
Awarding of Prizes
Address—"Another Look"
Wilfred Sykes
President, Inland Steel Company

THURSDAY—October 7

Morning Session

9:00 A.M. Report of Controller
Report of Director of Statistics
Address—"Steel in the Structure of Peace".....David Austin
Vice-President, U. S. Steel Corporation
Report of Nominating Committee
Report of Executive Vice-President

Afternoon Session

2:00 P.M. Problems of the Industry—Informal presentations by members from the floor
Election of Directors
Unfinished Business
New Business
Report of Committee on Time and Place of Next Convention
Report of Committee on Resolutions

Adjournment

4:00 P.M. Meeting of the Board of Directors

Farm Tractors Raised By International Harvester

Chicago

• • • International Harvester Co. has announced an overall price increase on its farm tractor line of about 9 pct. Officials of the company, in announcing the new increase in prices, said, "The increased costs compelled us to increase our farm tractor prices on June 3 last, our industrial power products on June 15, and some of our farm implements last spring."

"Since these increases we have made an 11¢ an hour wage increase to our employees, steel prices have advanced nearly \$10 a ton, there have been substantial

No. 18 in a series

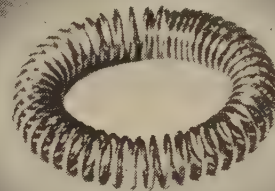


SPRING SCENES

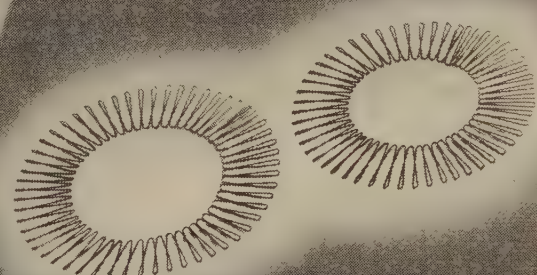
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Wire diameter .015"
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The versatile Torrington Spring Coiler permits a professional springmaker to turn out an unusually wide variety of spring designs. With quick adjustment of simple controls, he can coil springs to any practical specification — accurately, economically, and at high speed. Above springs were made on Model W-10. Thirteen other models with torsion and other attachments are available with wire diameters ranging from .003" to .750". Write for catalog.



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Hot Rolled.
1/2" to 10" Rd.

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6272
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FORGINGS

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price increases in coal, pig iron, and other basic materials. Transportation costs have advanced, and a great many of our suppliers have increased their prices to us to cover their increased wages and costs. As a result, our costs have risen so sharply that the price increases we are making now will no more than restore the actual low dollar profit on the three groups of products which we had at the time of the last increases."

New prices go into effect Sept. 7. The company pledged itself to holding the line as much as possible, and stated that farm implement prices have advanced less than the prices of most other manufactured goods, and farm commodity prices are still in a favorable relationship to the prices of their products.

International Harvester Continues Record Sales

Chicago

• • • For the months of May, June, and July of this year, sales by International Harvester Co. continued the record trend established during the first 6 months of the year. Third quarter sales were \$257,993,000 and were the highest quarterly sales in the history of the company. This was a gain of 5.14 pct over the previous quarter, and 2.85 pct higher than sales in the same quarter last year.

John L. McCaffrey, president, said that production in the Farm Implement Div. during this period was the highest level ever achieved. He also stated that the Refrigeration Division, Evansville, Indiana Works, completed the installation of all major manufacturing facilities during the third quarter, and that they are looking forward to attaining a production goal of 1000 units daily in the near future.

According to Mr. McCaffrey, the farm outlook is good. Farm income is still at high levels and there remains a large and effective demand for the things International makes. He added, however, that there are increasing signs that we may soon enter a period of farm product surpluses. "Without speculating on how this may affect prices received by farmers, I do wish to point out that there has been historically a high degree of correlation between farm income

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(1) If the goggle plate is cut before a leak is detected, the plate can be moved slightly to bring a new bearing surface into contact with the valve seats. This feature eliminates the necessity of renewing the plate every time a seriously burned area develops.

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(3) Because the seats remain in light contact with the plate while it is being swung open or closed, a minimum of gas is allowed to escape — an important safety feature.

(4) Brosius Goggle Valves can be equipped for motor operation.

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Designers & Manufacturers of Special Equipment for Blast Furnaces & Steel Mills
SHARPSBURG, Pittsburgh (15) PENNSYLVANIA

Heads Chevrolet Div.

• • • W. F. Armstrong, a vice-president of General Motors, has been named general manager of the Chevrolet Div. succeeding the late Nicholas Dreystadt.

Mr. Armstrong has been in charge of the manufacturing and real estate staffs of the central office since Aug. 1944. He joined the Remy Electric Co. in 1912 and served as production manager of Oldsmobile from 1925 to 1930. Armstrong was later named assistant manager of Frigidaire. He left GM in 1937 to become vice-president of Nash-Kelvinator and re-joined GM in 1943.

and the amount of farm equipment bought by farmers. A surplus of farm products might check the current unprecedented high volume of farm machinery sales."

Harvester's president also said that the voluntary allocation of steel by steel producers to military programs is being felt and probably will be felt in greater measure as time goes on.

U. S. Steel Export Co. Lists New Base Prices

New York

• • • The U. S. Steel Export Co. announced the following base prices, effective according to the dates indicated, with freight included to New York, Philadelphia or Baltimore.

These prices apply on carload lots and are subject to seller's current list of extras and deductions and conditions of sale. All sales are subject to seller's prices in effect at time of shipment.

July 21, 1948

Cold finished alloy steel bars. \$5.51 per 100 lb

Aug. 18, 1948

Fabricated concrete reinforcing bars \$5.07 per 100 lb

Aug. 26, 1948

Pet Discount

National A.P.I. Line Pipe, T&C
random lengths

Buttweld, 2½ in. and 3 in.

Black 40.9

Galvanized 21.9

Seamless, 3½ in. to 6 in. incl.

Black 33.9

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American Standard Pipe, T&C.

Buttweld, 2½ in. and 3 in.

Black 41.9

Galvanized 22.9

Seamless, 3½ in. to 6 in.

Black 34.9

Galvanized 15.4

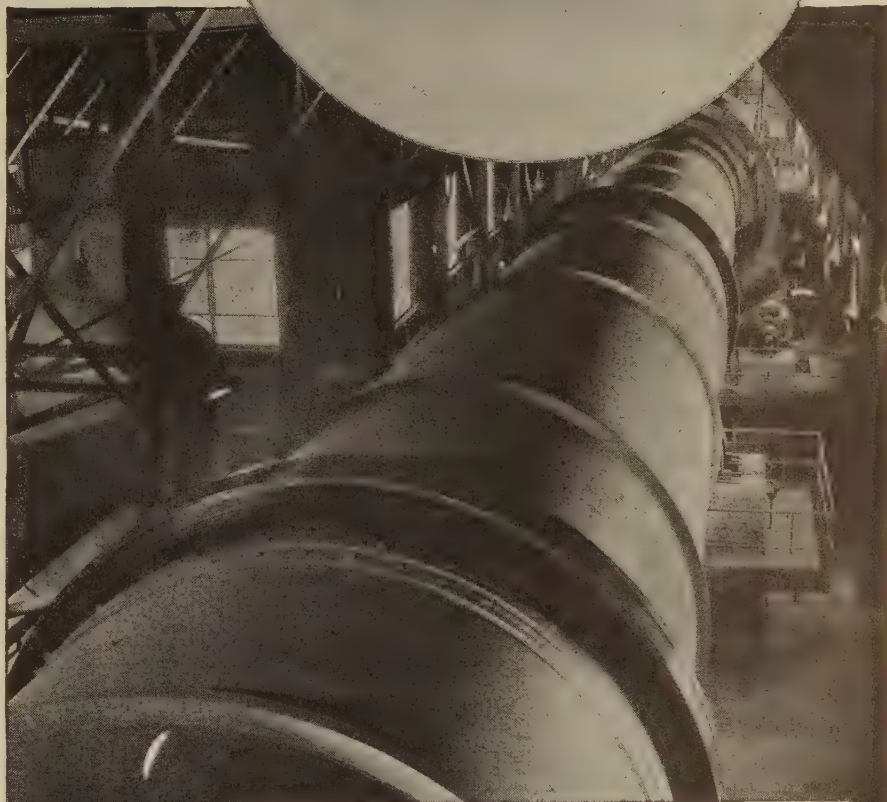
English Gas Tubes, T&C.

Buttweld, 2½ in. and 3 in.

Black 41

Galvanized 25

Anaconda MANGANESE NODULES



PRODUCTION of manganese nodules from the rhodochrosite ores of Butte's mines totalled 115,197 long tons in 1947, with an average manganese content of 59.62%. Anaconda's production is the principal U.S. source of supply for producers of ferro-manganese and other consumers of metallurgical grade ore.

Illustrated above is the 270-foot kiln at the Anaconda Reduction Works in which the manganese concentrates are sintered at a temperature of 2600° F.

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ALLOY GRAY IRON
GRAY IRON

Air Force Will Test World's Brightest Lights For "Blind" Landings

Pittsburgh

• • • Officials of the Westinghouse Electric Corp. Lighting Div. have announced that the world's brightest lights will be pitted against the nation's thickest fog this autumn by the U. S. Air Force in its search for a way to take the "blindness" out of "blind" landings.

The new lights will be tested at the armed forces Landing Aids Experiment Station, Arcata, Calif., which is considered the foggiest spot in America. The U. S. Air Force has ordered for Arcata a system of newly-developed all-weather approach lights which are designed to penetrate "zero-zero" fog for at least 1000 ft. The system will include 36 of the world's brightest lights—3300 million peak cp each—and 35 lights of somewhat lesser brilliance. Lined up in a row two thirds of a mile long, the 71 lights will produce lightning-like flashes to guide fog-bound pilots to the Arcata airfield runway.

When used in conjunction with the Instrument Landing System, the new approach lights will make possible nearly normal visual landings despite the poorest visibility conditions. At Arcata 36 krypton "flash" units will be placed in line alternately with 35 neon "blaze" units for almost two thirds of a mile. When flashed one after another, the lights in line will appear as a lightning stroke traveling toward the landing strip from the "inner radio marker" to which the pilot is guided by the ILS radio system.

The key to the tremendous brilliance of the krypton flash unit is a lamp the size of a cigaret developed during the war by engineers of the Westinghouse Lamp Div., Bloomfield, N. J. The lamp, only 4 in. long, is a slender quartz tube filled with krypton, one of nature's rarest gases. When a surge of electricity is discharged through the gas, the lamp flashes with a brilliance of 10 million cp per square in.—ten times greater than that of the sun. The reflector and optical system of the lighting unit magnifies this flash to three and one-third billion beam cp—the

equivalent during its brief interval of 50 million 60-w household bulbs and brighter than the largest searchlight ever built.

The line of 71 lights will flash 40 times a min and can be varied in intensity in accordance with weather conditions. In clearer weather, the krypton units can be cut in brilliance, or they can be turned off altogether in favor of the less brilliant neon units which serve either as flashing or steady lights of five different intensities.

A six-light installation at the Cleveland Municipal Airport has been tested for over a year with great success. The first full commercial installation of an approach system recently was completed at New York City's new International Airport.

Aluminum Leads Canada's Mineral Export Products

Toronto

••• Aluminum led as the most valuable of Canada's mineral exports for the first 7 months of this year. For this period, aluminum exports had a total value of \$61,444,000 or about 70 pct over the \$36,468,000 for the same period last year.

In 1938, when Canada's capacity for the production of aluminum was only about 15 pct of the total reached during the war years, exports were valued at \$12,539,000 for the 7 months and the price then prevailing was higher than that quoted today.

Exports of copper and lead were next in value in the mineral list, being valued at \$43,678,000 for the 7 months this year, an increase of \$18,600,000 of the same period last year.

Nickel was third in value of metal exports at \$42,991,000 against \$34,830,000 last year and was followed by zinc and products at \$19,740,000 against \$17,847,000 for the first 7 months of 1947.

Reports Net Profit

Muskegon, Mich.

••• Lakey Foundry and Machine Co. reports net profit of \$900,583 for the 9 month period ended July 31, 1948. This compares with a net profit of \$858,109 for the same period a year ago. Sales aggregated \$11,387,998, compared with \$10,954,151 a year ago.

NO REST FOR
CRIMPY



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"With me it's just work, work, work — particularly **WIRE WORK!**"

"Just about every industry (it seems) knows about my large range of weaves, crimps, metals, mesh and wire sizes . . . and about my maker's extensive facilities for working me into baskets, machine and window guards, partitions, enclosures, strainers and reel covers."

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NEXT MINUTE I'M FORMED

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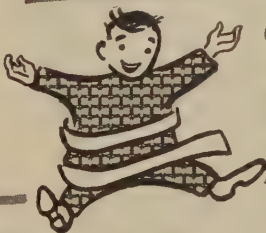
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together with other wire cloth into big panels (reel covers).



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. . . along the edges with webbing for screening and bolting machinery . . . or equipped with hook strips for vibrating screens. I'm **BOUND** to please.



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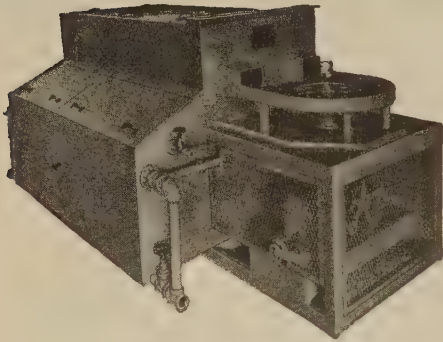
NEWS OF INDUSTRY

European Letter

(CONTINUED FROM PAGE 122)

they have the will and capacity to do something for him, and not merely talk about it, Communism will continue to extend its hold on the Chinese countryside. But, with the funds available and a definite policy for spending them, much can be done to provide attractions alternative to the Communist program and the beginnings of a new deal for the peasant without the threat of the *kolkhoz* which lurks behind the shop windows of Communist promises.

CERTAINLY, if the Nanking leaders and their American advisers have any skill at all in coordinating propaganda with their administrative measures, recent events in Europe should have placed some strong cards in their hands. The agrarian policy now being promoted by the Cominform in Eastern Europe has already made nonsense of the assurances of yesterday that the aim of the Communist-directed land reforms was to give land to the peasants in private ownership and that collectivization was not intended. There can be no doubt that the ability of Communists to exploit peasant land-hunger as a revolutionary force depends on the peasant's expectation of having land of his own and on systematic concealment by Communists of their ulterior aims. But now that peasant ownership is being threatened in the "People's Democracies" of Europe even sooner after the re-division of the land than it was in Russia, the cat is fairly out of the bag and the Chinese peasant may well be capable of recognizing the animal if he can get a good view of it. The Chinese Communists continue loudly to assert that they have no object but to endow peasant proprietors—in Manchuria their radio even boasts of creating large farms operated by "private capitalists" on 20-year leases—but it must become increasingly difficult for them to square their programs with the Cominform denunciations of Tito for allegedly pursuing similar agrarian policies. It is, of course, open to them to take Tito as their model, but how could they reconcile this with their proclaimed devotion to the Soviet

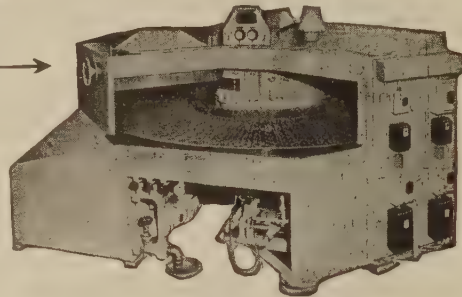


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- No marring of parts
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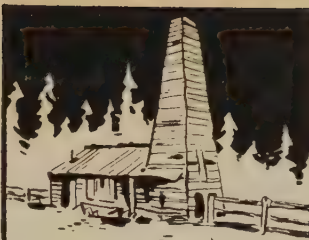
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Union and their present dependence on it for moral and material support?

EVEN without headaches over Tito, Chinese Communist agrarian policy seems to have run into heavy weather on the route southward. The Communists have apparently decided to suspend land reform in their areas of control in Central China because this region had not been sufficiently prepared for its enforcement and to substitute a system of rent and interest reductions. It is complained that "the political consciousness of the farmers had not been sufficiently awakened, with the result that there was a lack of confidence in the success of the revolution." These difficulties suggest that the Communists find it harder going as they penetrate into what used to be "Free China" during the war than it has been in Manchuria and those parts of North China which were under effective Japanese occupation and where, as a result, the structure of Chinese society was disrupted and the officials and propertied classes either fled or went over to the Japanese. There is indeed no reason to expect that a decisive Communist victory in North China would be automatically followed by similar success in the South within a short period.

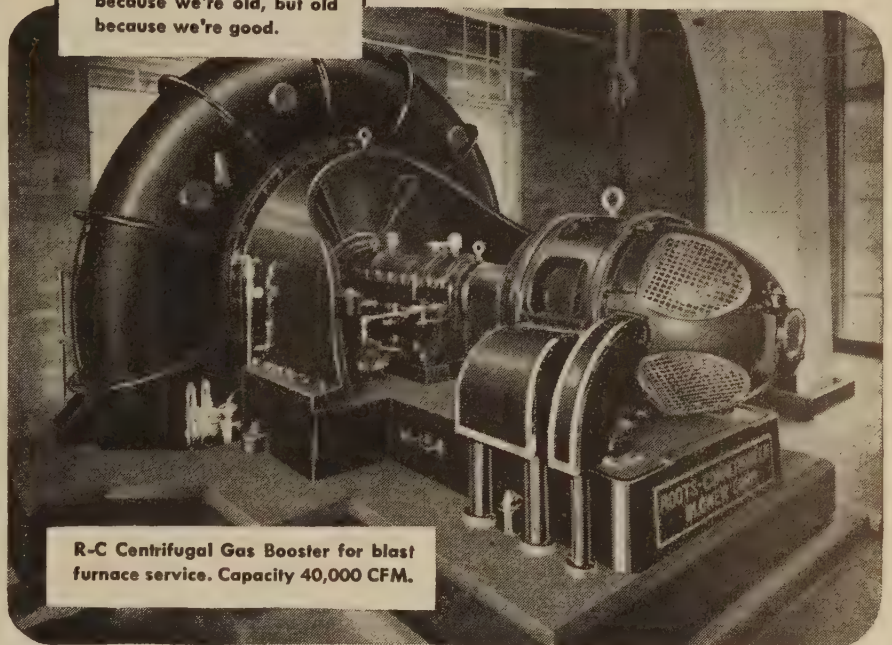
Meanwhile China misses a celebrated personality whose arrival via Siberia was expected with much excitement in Chinese political quarters. General Feng Yu-hsiang, the "Christian General"—who has been perhaps better described as an "Old Testament Christian"—denounced the Nanking Government from North America several months ago and there has been speculation on the possibility of his forming a coalition with the Communists and even eventually emerging as the leader of a "third force" in China. Perhaps his old influence in North China would have been a valuable asset for the Communists; perhaps he would have double-crossed them, as he double-crossed every faction with which he was allied in his political career. But now we shall never know, for he perished in a fire in a Russian ship that was taking him to Odessa. It is possible, though not probable, that his death was accidental.



Oil was first produced by drilling in 1859, five years after the first Roots Blower was built. We're not good because we're old, but old because we're good.

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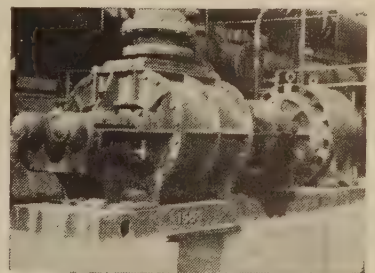
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That's because of our *dual-ability* to design and build both types. We recommend whichever is best suited to the specific application, and are the only blower builders that can offer you this important *dual choice* . . . an exclusive advantage which usually saves time, money and trouble.

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Shipments Moving Slowly in Most Major Buying Sectors

• • • On the surface, at least, better things seemed to be ahead for the machine tool industry last week after several months of disappointment and delay in government programs, including Economic Cooperation Administration and national defense, some months of spotty business, and the withdrawal from the market of many foreign buyers.

In Glenwood Springs, Colo., Harry L. Erlicher, vice-president, General Electric Co., in charge of purchasing and traffic, told a meeting of the Rocky Mountain Electrical League that "business will be good for a long time on a new and healthier but perhaps slightly lower plateau."

If business men apply ingenuity, manufacturing experience and new production techniques for the next 5 years, Mr. Erlicher said, the possibilities of another serious depression "may seem to have evaporated into thin air."

An economic "change of pace" may be expected to swerve to lower prices somewhat "perhaps in 1949," he added. Such a change would be brought about by buyer resistance or technological improvements or by both.

Almost simultaneously, A. G. Bryant, president, National Machine Tool Builders' Assn., outlining a four-point program at a press conference in New York, said that NMTBA will ask ECA to add a machine tool section to speed up official approval of \$150 million in orders for U. S. machine tools in current order backlogs of European distributors.

Mr. Bryant, who had returned from an extensive tour of Europe only hours before, said European distributors are unable to process these orders because their countries have been unable to get dollars released for this type of purchasing.

He said Italy has the largest active program for buying productive machinery, adding that France also needs tools of all kinds.

According to Mr. Bryant, European politicians have been playing

Recent Events Cause Officials To View Future Conditions With Greater Optimism

• • •

politics with ECA funds. Individual buyers have been stopped from purchasing because dollars have not been available and their own governments have not asked ECA for allotments for machine tools.

Under the four-point plan, European users of machine tools are being asked to go to their governments to get allotments arranged for machine tool buying; ECA is being asked to point out to Western nation governments that tool purchases ought to be made as a recovery measure; American machine tool builders are aiming at restoring export sales to the normal prewar level of 20 pct of their production; and ECA is to be asked to install a machine tool section to expedite approval of requests for allotments for machine tool purchases abroad.

He said the industry here needs a revival of "old fashioned salesmanship" to help western European nations obtain the benefits of low cost production.

Mr. Bryant added that the British machine tool industry is 1½ years behind on machine tool deliveries.

As a fillip to these developments it was learned that if a proposed draft of renegotiation regulations now being circulated in industry for comment by Secretary of Defense James V. Forrestal is adopted, normal advertising and sales expenses will be considered a necessary cost of doing business before determination of profit in renegotiation of defense contracts.

Subcontractors are also permitted to allocate product advertising. However, the regulation does not recognize as a legislative charge against defense contracts any advertising of special products or services that differ materially from those sold by a company in the nor-

mal operation of its business. In determining what constitutes a reasonable advertising expenditure, the Defense Dept. proposes to be guided by the Internal Revenue Bureau's policy on "reasonableness of cost."

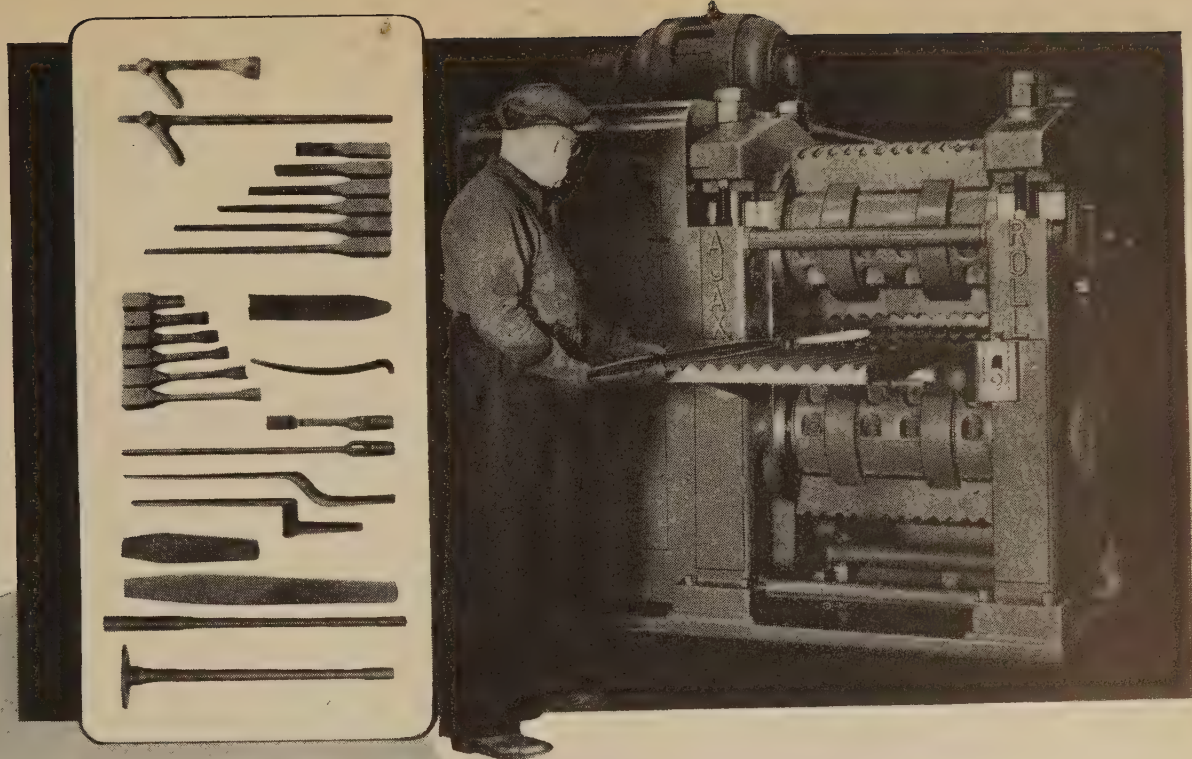
Despite these optimistic overtones, machine tools were moving pretty slowly in most major buying sectors. Sales representatives were out wrestling for business. Price resistance was not a factor, for the buyers seemed to be more interested in what a given machine could do in the way of cutting costs than they were in price.

Preliminary estimates by authoritative sources in the trade put August firm orders down 5 pct from July levels, shipments up about 10 pct, cancellations down a little bit and unfilled orders about the same.

In Detroit, inquiries continue to roll in to suppliers, but new contracts are reported to be very slow. With the filling of additional quotations this week, it is expected that some placements will be made during the next few weeks by the Saginaw Transmission Div.

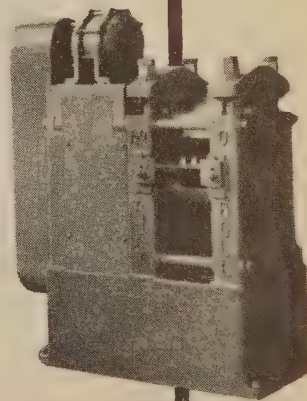
There are indications that some new equipment may be purchased at Buick and that a limited number of new contracts for the Packard transmission will be placed in the near future. Some sources indicate that Willys-Overland has some ambitious expansion plans that will call for considerable new tooling. Similarly, hope is held that once Kaiser-Frazer's financial problems are straightened out some of the numerous engine developments will call for a substantial investment in new equipment.

It should be emphasized, however, that new orders in the hands of Detroit suppliers are spotty at best and that some builders of special equipment have had to reduce their staffs to a considerable extent because of their present low volume. Up to the present time, the defense tooling work appears to be largely confined to the jet engine program.



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Outlook Brightens As Strikebound Plants Resume Their Operations

New York

• • • Good news for lead consumers appeared this week when it developed that the men at all struck plants of St. Joseph Lead Co. in southeastern Missouri went back to work on Monday. The men have returned to work without a contract so there is nothing to report at this time as to new wage rates.

Elections are to be held next week to determine which union is to be the bargaining agent at these plants. The strike at the St. Joseph properties which began on July 7 is estimated to have cost a total of 25,000 tons of lead, figuring 2500 tons loss a week.

There is no change at this time in the strikes at the zinc producing plants of the American Zinc, Lead & Smelting Co., but producers and consumers are hopeful that the formula worked out for the lead producer could be applied to the zinc strike. Conditions involved in both strikes were similar, involving the same union, the International Union of Mine, Mill & Smelter Workers, and the same principal stumbling block, failure of union officials to execute a non-Communist affidavit as required by the Taft-Hartley Act.

In the meantime, the position of consumers of lead and zinc continues to be desperate, and high premium prices are being paid in both metals. Authenticated sales of foreign lead have been made at prices of 24¢ and 24.50. One purchase of foreign lead was made in Philadelphia at 24.65¢. Still higher prices are being paid for secondary lead. The highest figure that has

Workers Return to Their Jobs
Without Contract Pending
Outcome of Election

o o o

been substantiated is a purchase of a small tonnage of secondary at 27¢. The highest premium price for zinc that can be substantiated at this time is of resale Prime Western which sold at 17.25¢.

Producers of lead, zinc and antimony from Mexican concentrates are seriously concerned with the application of the 15 pct Mexican export tax. They have learned that the export tax is applicable to exports of ores and concentrates as well as to metals. In lead this represents an additional cost of \$60 a ton. In zinc, it means an increased cost ranging from \$40 to \$60 a ton.

So far, producers are working in the dark on the effect of the tax, as there is some possibility that there may be a readjustment downward of production taxes to compensate. Although there have been no price increases in the domestic market in view of the uncertainty in this matter, it is clear that price increases in lead, zinc and antimony might result from this situation at any time, particularly in view of the premium prices now prevailing widely for the first two metals in this country.

The demand for copper is still strong, particularly for copper shapes. Wire mill demand is very heavy and there are indications that orders for wire mill products are increasing under the impetus

of the accelerated stockpiling program. The copper market is firm for domestic and export at 23.50¢ for nearby delivery. More October business could be placed than the metal available.

A meeting of world producers of copper, lead and zinc has been scheduled in Washington for early October to study the prospects for further acceleration of the domestic stockpiling program of the Munitions Board. In addition to domestic and South American producers, it is expected that there will be representatives of producers from Chile, Peru, Mexico, Canada and Australia.

Chairman Thomas Hargraves of the Munitions Board has resigned and his place will be taken by Donald F. Carpenter, former chairman of the military liaison committee of the Atomic Energy Commission. Mr. Carpenter had been an official of the Remington Arms Co. before taking over the atomic energy post. Producers do not anticipate that the change will forecast any change in the policy of accelerated strategic stockpiling.

It is this policy of accelerated strategic stockpiling which has recently been the cause of grave concern on the part of procurement plagued nonferrous consumers. This policy, added to losses in production caused by strikes, has put the pinch on them until they were ready to yell, "Uncle."

Metal & Thermit Buys
Into Detinning Plant

New York

• • • Metal & Thermit Corp. has acquired a controlling interest in the Standard Metal Refining Co., Baltimore, operating a detinning plant.

It is understood that the plant will continue operations under the management of Metal & Thermit Corp. as an independent unit on a partnership basis.

Nonferrous Metals Prices

	Sept. 15	Sept. 16	Sept. 17	Sept. 18	Sept. 20	Sept. 21
Copper electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
Zinc, East St. Louis	15.00	15.00	15.00	15.00	15.00	15.00
Lead, St. Louis	19.30	19.30	19.30	19.30	19.30	19.30

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	15.00 to 17.00
Aluminum pig	15.00 to 16.00
Antimony, American, Laredo, Tex.	35.00
Beryllium copper, 3.75-4.25% Be	dollars per lb contained Be.....\$20.50
Beryllium aluminum 5% Be, dollars per lb contained Be.....	\$40.00
Cadmium, del'd	\$1.90
Cobalt, 97-99% (per lb)	\$1.65 to \$1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Iridium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$110 to \$120
Lead, St. Louis	19.30
Lead, New York	19.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask, f.o.b. New York	\$75 to \$78
Nickel, electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$93 to \$96
Silver, New York, cents per oz.	75.25
Tin, Grade A, New York	\$1.03
Zinc, East St. Louis	15.00
Zinc, New York	15.65
Zirconium copper, 20 pct Zr, per lb contained Zr.	\$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot		
No. 115	19.50*	22.00
No. 120	19.00*	21.50
No. 123	18.50*	21.00
80-10-10 ingot		
No. 305		27.25
No. 315		24.25
88-10-2 ingot		
No. 210		33.00
No. 215		31.00
No. 245	24.00*	25.75
Yellow ingot		
No. 405	15.75*	17.50
Manganese bronze		
No. 421		23.00
* F.o.b. Philadelphia.		

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	26.50-27.50
0.60 copper, max.	26.25-26.75
Piston alloys (No. 122 type)	24.25-24.75
No. 12 alum. (No. 2 grade)	23.50-24.00
108 alloy	23.50-24.25
195 alloy	23.50-24.50
13 alloy	26.00-27.00
AXS-679	24.00-24.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct.	24.50-25.50
Grade 2—92 pct-95 pct.	24.00-25.00
Grade 3—90 pct-92 pct.	23.00-24.00
Grade 4—85 pct-90 pct.	22.75-23.50

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40½
Electrodeposited	34½
Rolled, oval, straight, delivered	37.34
Ball anodes	38½
Brass, 80-20	
Cast, oval, 15 in. or longer	35½
Zinc, oval, 99.99	22.50
Ball anodes	20.50
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	\$2.00
Silver 999 fine, rolled, 100 oz. lots, per troy oz.	83

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5, crystals, bbls.	9.35
Nickel salts, single or double, 100 lb bags, frt. allowed	17.50
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	64½
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc cyanide, 100 lb drums	37.00
Zinc sulfate, 89 pct, granules, bbls, monohydrated, frt. allowed	7.90

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 25.7¢; 4S, 26.8¢; 52S, 29.9¢; 24S-O, 24S-OAL, 28.8¢; 75S-O, 75S-OAL, 35.3¢. 0.081 in., 2S, 3S, 26.8¢; 4S, 61S-O, 29.2¢; 52S, 31.3¢; 24S-O, 24S-OAL, 29.9¢; 75S-O, 75S-OAL, 37.0¢. 0.032 in., 2S, 3S, 28.5¢; 4S, 61S-O, 32.5¢; 52S, 35.2¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 46.6¢.

Plate: ¼ in. and heavier: 2S, 3S, 22.8¢; 4S-F, 25.0¢; 52S, 26.1¢; 61S-O, 25.6¢; 24S-F, 24S-FAL, 26.1¢; 75S, 75S-AL, 32.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 31¢ to 59¢; 11 to 13, 31.9¢ to 69¢; 23 to 25, 33.4¢ to 90¢; 35 to 37, 40.8¢ to \$1.25; 47 to 49, 58.7¢ to \$1.84.

Extruded Round Rod, Square, Hex, Octagonal Bar: ¼ in. and over, 27¢ to 38¢; ½ to ¾ in., 28¢ to 40.5¢; ¾ to 1½ in., 29¢ to 43¢; 1½ to 3½ in., 30¢ to 46.5¢; 3/16 to 7/32 in., 32.5¢ to 53.5¢; 9/64 to 5/32 in., 35.5¢ to 62¢.

Rolled Rod: 1.064 to 4.5 in., 2S, 3S, 33¢ to 29.5¢; Cold-finished rod, 0.375 to 3.5 in., 2S, 3S, 35.5¢ to 31¢.

Screw Machine Stock: Drawn, ½ to 11/32 in., 11S-T3, R317-T4, 48¢ to 34¢; cold-finished ¾ to 1½ in., 11S-T3, 37.5¢ to 34.5¢; ¾ to 2 in., R317-T4, 33¢ to 30¢; rolled, 1 9/16 to 3 in., 11S-T3, 34.5¢ to 31.5¢; 2½ to 3½ in., R317-T4, 29.5¢ to 28.5¢. Base 5000 lb.

Drawn Wire: coiled, 0.051 to 0.374 in.: 2S, 35¢ to 25.5¢; 52S, 43¢ to 31¢; 56S, 45.5¢ to 37¢; 17S-T4, 49¢ to 33.5¢; 61S-T4, 43.5¢ to 33¢; 75S-T6, 75¢ to 54¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: M, FSA, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-1.01; 22, \$1.22-\$1.31; 24, \$1.62-\$1.75. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft. for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb. per ft. per. up to 5.9 in., 61¢; 0.50 to 0.59 lb. per ft. per. up to 8.6 in., 47¢; 1.8 to 2.59 lb. per ft. per. up to 19.5 in., 44¢; 4 to 6 lb. per ft. per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.067, ¼ to 5/16, \$1.14; 5/16 to ¾, \$1.02; ¾ to 1, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ¾ to 7/16, 85¢; ¾ to 1, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ¾ to 1, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78		37.18
Copper, hot-rolled		33.28	
Copper, drawn		34.28	
Low brass	38.07*	34.85	35.16
Yellow brass	36.76*	33.44	33.75
Red brass	35.55*	35.33	35.64
Naval brass	33.92	32.67	38.61
Leaded brass		28.30	
Commercial			
bronze	39.29*	36.32	36.63
Manganese bronze	37.51	36.01	42.11
Phosphor bronze, 5 pct	57.80*	56.30	56.05
Muntz metal	33.47	32.22	36.66
Everdur, Herculey, Olympic, etc.	40.43	40.67	41.73
Nickel silver, 10 pct		46.42	44.20
Architectural			
bronze			32.33
* Seamless tubing.			

Scrap Metals

Brass Mill Scrap

(Cents per pound; add 1¢ per lb for shipments of 15,000 or more)

	Heavy	Turn-ings
Copper	21½	20½
Yellow brass	18	17½
Red brass	19½	19
Commercial bronze	19½	19
Manganese bronze	17½	16½
Leaded brass rod ends	17½	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	20.00
No. 2 copper wire	19.00
Light copper	18.00
Refinery brass	18.00
* Dry copper content.	

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.25
No. 2 copper, wire	18.25
Light copper	17.25
No. 1 composition	16.00
No. 1 comp. turnings	15.50
Rolled brass	12.00
Brass pipe	12.50
Radiators	13.25
Heavy yellow brass	11.50

Aluminum

Mixed old cast	10.50
Mixed old clips	10.50
Mixed turnings, dry	10.00
Pots and pans	11.00
Low copper	11.50

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	17½-17¾
No. 2 heavy copper and wire	16½-16¾
Light copper	15½-16
Auto radiators (unsweated)	10¾-11¼
No. 1 composition	13¼-13½
No. 1 composition turnings	12¾-13
Clean red car boxes	9¾-10
Cocks and faucets	9¾-10
Mixed heavy yellow brass	8¼-8¾
Old rolled brass	9¾-10
Brass pipe	10¾-11
New soft brass clippings	13¼-14
Brass rod ends	11-11½
No. 1 brass rod turnings	10¼-10¾

Aluminum

Alum. pistons and struts	7½-8
Aluminum crankcases	9-9½
2S aluminum clippings	11½-12
Old sheet & utensils	9-9½
Borings and turnings	4½-5
Misc. cast aluminum	9-9½
Dural clips (24S)	9-9½

Zinc

New zinc clippings	10-10½
Old zinc	7¾-8¼
Zinc routings	4-4½
Old die cast scrap	4½-5

Nickel and Monel

Pure nickel clippings	21-22
Clean nickel turnings	16-17
Nickel anodes	21-22
Nickel rod ends	21-22
New Monel clippings	14-15
Clean Monel turnings	10-11
Old sheet Monel	12½-13
Old Monel castings	10-11
Inconel clippings	10-11
Nickel silver clippings, mixed	8-8½
Nickel silver turnings, mixed	6½-7

Lead

Soft scrap lead	17-17½
Battery plates (dry)	11-11½

Magnesium Alloys

Segregated solids	8-9
Castings	4½-5½

Miscellaneous

Block tin	82-84
No. 1 pewter	65-67
No. 1 auto babbitt	51-53
Mixed common babbitt	14¾-15¼
Solder joints	19¾-20¼
Siphon tops	50-52
Small foundry type	20-20½
Monotype	19-19½
Lino. and stereotype	18-18½
Electrotype	16½-17
New type shell cuttings	15-15½
Hand picked type shells	9½-10
Lino. and stereo dross	6½-10
Electro dross	6½-7

Here's a Crane that's Tailor Made for Handling **SCRAP!**



Special Axle:

New type axle has been increased in width and height. Multiple-hinged shoes have been increased in width from 20" to 24". The new UNIT 1020A now has equal stability over both sides and ends. Handles a 45" Magnet with ease.

THE NEWLY DESIGNED **UNIT 1020A** With All the Features You Need ... or Ever Will Need!

- Pendant Boom Suspension . . . boom length can be altered without re-reeving boom hoist cable.
- Throttle Lever is within easy reach of operator . . . positive power and speed control at all times.
- Heavier, air-cooled Double Disc Clutches . . . for smooth performance and easy operation.
- Improved Automatic Traction Brakes with sectional linings which are easily replaced without removing shaft from machine.
- New leak-proof Oil Seals . . . keeps lubricants in . . . and dirt and abrasives out.
- New style foot brakes with self-aligning bearings on brake operating shafts. Wider, self-equalizing brake bands which eliminate dragging or scoring.



Swing Lock Control:

Hand operated swing lock control within easy reach of operator . . . no more stooping, kicking, or leaving cab for this operation.



New Type Magnet Fairlead:

This elevated Fairlead is especially adapted for magnet operation. It equalizes cable contact on two sheaves instead of one, minimizes unnecessary wear.



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UNIT CRANE & SHOVEL CORP.

6517 W. BURNHAM STREET

MILWAUKEE 14, WIS., U. S. A.

Buying By Large Mills Is Less Aggressive

New York

... Prices of all grades are generally holding their own. The market is firm and shipments continue to move as usual.

Because of misunderstanding arising from nomenclature in Pittsburgh for No. 1 cupola cast, a change has been made. No. 1 cupola cast has been removed from the quotations and replaced with No. 1 machinery cast quoted at \$69.50 to \$70.50 and mixed yard cast which sells at \$63.50 to \$64.50. A similar differentiation was recently made in the New York quotations for this grade.

Cast grades in Philadelphia and New York were stronger last week and as a result heavy breakable cast went up \$1 to \$62 to \$63 in Philadelphia while mixed cupola cast went up \$1 to \$57 to \$58 in New York.

Although the demand is strong in all areas, the large consuming mills are not driving as hard as in the past to get scrap. Some are becoming more rigid in their inspection. As a result the poorer grades are becoming harder to sell.

Other railroad companies are not inclined to follow the New York Central line in its move to cease selling on an earmarked or allocated basis. This takes some of the strengthening effect from the move made last week that was potentially a threat to existing prices on the railroad grades.

Lack of panic on the part of the larger mills in buying up all the scrap they can get their hands on indicates that in all probability good progress is being made in building up winter stockpiles.

Foreign scrap has aided several companies in their stockpiling efforts already and further aid is expected before winter sets in. However, shipping congestion at European ports and lack of agreement generally on prices and allocation of German scrap by allied nations puts a crimp in the optimism about what will come from Germany and when.

PITTSBURGH—The market moved indifferently during the past week. No mills here are in urgent need of scrap. They are not passing up any good buys but all have stocks on the ground and may sit back a while and see how prices turn. Poor grade scrap is getting harder to sell. Railroad specialties were \$1 stronger on the latest awards in the district. So far no other roads have indicated any intention of following N. Y. Central action of awarding No. 1 railroad steel to the highest bidder, in place of allocating it. Rails 2-ft and under in length were off \$1. Because of increasing foundry emphasis on cast quality, "No. 1 cupola cast," has been dropped on the district price quotations. It is replaced by "No. 1 machinery cast" and "mixed yard cast."

CHICAGO—The mills are still not pressing to place new orders. One mill is still refusing to accept dealers scrap. Brokers report that they can buy at current prices, but nobody is knocking at the door trying to sell to them. It appears that the mills may be trying to drive the price down. Observers here predict that their chances of doing so are extremely slim. Some railroad specialties fell off a little last week. Very few of the railroads are selling all their heavy melting scrap at the mill's price. Most of them split this price.

PHILADELPHIA — The scrap market was firm at previous prices last week, but mill scrap intake was improving with domestic and some foreign shipments. The scrap trade was buzzing with news of the higher prices being offered in Philadelphia and Allentown for openhearth and blast furnace grades. So far there is no indication that the tonnages involved require the quotation of higher prices in this market. There was a definite strengthening in the cast market and heavy breakable is quoted \$1 higher. Pipe foundries are still paying \$62 for cast but are not able to obtain all they need. The chemical borings market is growing stronger with all buyers back in the market. Some prices now being paid are higher than the bulk of the sales at the quoted market.

CLEVELAND—Little change was evident this week in the market here or in the valley. Other major railroads were showing no inclination to go along with the road which recently sold material to the highest bidder, refusing to allocate or earmark material, but this was by no means general. Shipments are about the same, which means that most consumers are doing well to get their consumption. There are scattered efforts afoot to "bear" the market, but the only evidence of weakness, if it can be considered as such, is that higher priced scrap aside from railroad offerings has toned down a little bit. Major consumers are holding to quoted prices and hoping that foreign scrap starts

pouring into the country before snow flies. This is a very pretty dream in view of the fact that nobody has enough scrap to drop out of the market right now.

DETROIT—Prices of all grades are holding at earlier levels despite a marked reduction in scrap flow stemming from the Briggs' plant guard strike which has halted production at Chrysler and Packard. Cast grades are about the same in a market in which only limited buying is reported. Several foundries here have been slowed down to a walk as another corollary to the Briggs strike.

CINCINNATI—Demand for openhearth material continues strong, with supply weak. Foundries in this area are pretty well out of the market, which makes the market look pricewise, on the foundry grades, a little top heavy. Shipments to openhearth consumers are fair. There is a minimum of trading at prices higher than those quoted.

NEW YORK — There were no major price changes last week except for the mixed cupola cast grade which moved up \$1 to \$57 to \$58. Demand for the cast grades is keen with four mills on the market for this product. The market is generally strong although a slight weakness is reported in some quarters. Shipment movements continue to be fair. Shipments for chemical borings are slow. Demand is holding up for chemical and cupola use.

BOSTON—There is no change in the scrap market, with No. 1 heavy melting continuing to move substantially above the formula price of \$34.40. Cast grades have been moving slower since the Labor Day holiday, and the market is so spotty, dealers are reluctant to quote prices. Chemical borings eased off a little and are selling up to \$38 a ton as compared to \$38.50.

BIRMINGHAM—A continuing scramble by consumers for cast scrap highlights the market in this area. No. 1 cupola cast is fast becoming a rarity. Mills are obtaining their consumption of steel although receipts generally have dropped off at dealers' yards. With harvest in full swing, very little agricultural scrap is moving.

ST. LOUIS — The movement of scrap iron of all types to the St. Louis industrial district has been good, with result that steel mills and foundries generally have been able to pile up substantial inventories. The steel mills are not out of the market, but are not reaching out to distant points for material.

BUFFALO—The market was firm again this week with no change in prices. Shipments tapered off a little but the same demand continues. Reports are prevalent of out-of-district buying at higher than current prices, but not in any quantities large enough to affect the market. Mills are buying all the scrap they can get but they are choosy and prone to reject poor material.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.50 to \$43.00
RR. hvy. melting	43.50 to 44.00
No. 2 hvy. melting	42.50 to 43.00
RR. scrap rails	57.50 to 58.50
Rails 2 ft and under	62.00 to 62.50
No. 1 comp'd bundles	42.50 to 43.00
Hand bld. new shts.	42.50 to 43.00
Hvy. axle turn.	45.50 to 46.50
Hvy. steel forge turn.	45.50 to 46.50
Mach. shop turn.	37.50 to 38.00
Shoveling turn.	39.50 to 40.00
Mixed bor. and turn.	37.50 to 38.00
Cast iron borings	39.50 to 40.00
No. 1 mach. cast	69.50 to 70.50
Mixed yard cast	63.50 to 64.50
Hvy. breakable cast.	58.00 to 59.00
Malleable	76.00 to 77.00
RR. knuck. and cup.	60.00 to 61.00
RR. coil springs	60.00 to 61.00
RR. leaf springs	60.00 to 61.00
Rolled steel wheels	60.00 to 61.00
Low phos.	49.50 to 50.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$41.50 to \$42.00
No. 2 hvy. melting	41.50 to 42.00
No. 1 bundles	41.50 to 42.00
No. 2 dealers' bundles	41.50 to 42.00
Bundled mach. shop turn.	39.50 to 40.00
Galv. bundles	39.50 to 40.00
Mach. shop turn.	36.50 to 37.00
Short shov. turn.	38.50 to 39.00
Cast iron borings	37.50 to 38.00
Mix. borings and turn.	36.50 to 37.00
Low phos. hvy. forge.	51.00 to 52.00
Low phos. plates	49.00 to 50.00
No. 1 RR. hvy. melt.	44.25 to 48.50
Rerolling rails	64.00 to 67.75
Miscellaneous rails	62.00 to 63.00
Angles & splice bars	57.50 to 58.00
Locomotive tires, cut	59.00 to 60.00
Cut bolster & side frames	50.00 to 51.00
Standard stl. car axles	75.00 to 77.00
No. 3 steel wheels	56.00 to 57.00
Couplers and knuckles	56.00 to 57.00
Rails, 2 ft and under	64.00 to 67.00
Malleable	82.00 to 83.00
No. 1 mach. cast.	70.00 to 72.00
No. 1 agricul. cast.	63.00 to 68.00
Heavy breakable cast.	63.00 to 64.00
RR. grate bars	66.00 to 67.00
Cast iron brake shoes	57.00 to 58.00
Cast iron car wheels	62.00 to 63.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turn.	37.00 to 38.00
Cast iron borings	36.00 to 37.00
Mixed bor. & turn.	35.00 to 36.00
Low phos., 18 in. under	48.00 to 49.00
No. 1 cupola cast.	66.00 to 68.00
Hvy. breakable cast	59.00 to 60.00
Rails 18 in. and under	63.00 to 65.00
Rails random length	57.00 to 59.00
Drop broken	71.00 to 72.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$37.00 to \$38.90
No. 2 hvy. melting	35.50 to 36.00
Nos. 1 and 2 bundles	35.50 to 36.00
Bushelings	35.50 to 36.00
Shoveling turn.	31.40 to 32.50
Machine shop turn.	29.40 to 31.50
Mixed bor. and turn.	29.40 to 31.50
Cl'n cast chem. bor.	37.50 to 38.00
No. 1 machinery cast.	64.00 to 65.00
No. 2 machinery cast.	59.00 to 60.00
Heavy breakable cast.	53.50 to 54.50
Stove plate	52.50 to 53.50

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	\$38.00
No. 2 hvy. melting	38.00
No. 1 bundles	38.00
New busheling	38.00
Flashings	38.00
Mach. shop turn.	\$32.50 to 33.00
Shoveling turn.	34.50 to 35.00
Cast iron borings	33.50 to 34.00
Mixed bor. & turn.	34.50 to 35.00
Low phos. plate	42.50 to 43.00
No. 1 cupola cast.	58.00 to 62.00
Heavy breakable cast.	53.00 to 57.00
Stove plate	56.00 to 57.00
Automotive cast.	62.00 to 64.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$44.50 to \$45.50
No. 2 hvy. melting	41.00 to 41.50
No. 1 bundles	44.50 to 45.50
No. 2 bundles	41.00 to 41.50
Mach. shop turn.	36.50 to 37.50
Shoveling turn.	38.00 to 38.50
Mixed bor. and turn.	36.50 to 37.50
Clean cast chemical bor.	41.50 to 43.00
No. 1 machinery cast.	65.00 to 66.00
No. 1 mixed yard cast.	61.00 to 62.00
Hvy. breakable cast.	62.00 to 63.00
Clean auto cast.	65.00 to 66.00
Hvy. axle forge turn.	46.00 to 47.00
Low phos. plate	51.00 to 52.00
Low phos. punchings	51.00 to 52.00
Low phos. bundles	48.00 to 49.00
RR. steel wheels	53.00 to 54.00
RR. coil springs	53.00 to 54.00
RR. malleable	78.00 to 80.00
Cast iron carwheels	68.00 to 70.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$43.00 to \$44.00
No. 2 hvy. melting	40.00 to 41.00
Bundled sheets	40.00 to 41.00
Mach. shop turn.	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Locomotive tires, uncut.	50.00 to 51.00
Mis. std. sec. rails.	54.00 to 56.00
Steel angle bars	54.00 to 55.00
Rails 3 ft and under	58.00 to 60.00
RR. steel springs	51.00 to 52.00
Steel car axles	56.00 to 57.00
Grate bars	59.00 to 60.00
Brake shoes	59.00 to 60.00
Malleable	73.00 to 75.00
Cast iron car wheels	61.00 to 62.00
No. 1 machinery cast.	66.00 to 68.00
Hvy. breakable cast.	59.00 to 60.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$40.00
No. 2 hvy. melting	40.00
No. 2 bundles	40.00
No. 1 busheling	40.00
Long turnings	\$27.50 to 28.50
Shoveling turnings	29.50 to 30.50
Cast iron borings	29.00
Bar crops and plate	44.00 to 45.00
Structural and plate	44.00 to 45.00
No. 1 cupola cast.	64.00 to 67.00
Stove plate	63.00 to 64.00
No. 1 RR. hvy. melt.	41.00
Steel axles	51.00 to 52.00
Scrap rails	44.00 to 45.00
Rerolling rails	57.00 to 60.00
Angles & splice bars	51.00 to 53.00
Rails 3 ft & under	52.00 to 55.00
Cast iron carwheels	50.00 to 55.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.50 to \$43.00
No. 2 hvy. melting	42.50 to 43.00
Mach. shop turn.	37.50 to 38.00
Short shov. turn.	39.00 to 40.00
Cast iron borings	38.00 to 39.00
Low phos.	47.50 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$38.50 to \$39.00
No. 2 hvy. melting	37.00
No. 2 bundles	37.00
Mach. shop turn.	31.50 to 32.00
Mixed bar. & turn.	31.50 to 32.00
Shoveling turnings	33.50 to 34.00
Machinery cast.	59.00 to 60.00
Mixed yard cast	57.00 to 58.00
Clean auto cast.	57.50 to 58.50
Heavy breakable cast.	56.00 to 57.00
Charging box cast.	56.00 to 57.00
Unstrp. motor blks.	55.00 to 56.00
Cl'n cast chem. bor.	38.00 to 39.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$47.00 to \$49.00
No. 2 hvy. melting	41.75 to 42.2
No. 1 bundles	41.75 to 42.2
No. 2 bundles	41.75 to 42.2
No. 1 busheling	41.75 to 42.2
Mach. shop turn.	36.75 to 37.2
Shoveling turn.	37.25 to 38.0
Cast iron borings	37.75 to 38.2
Mixed bor. and turn.	36.75 to 37.2
Clean auto cast.	63.00 to 64.0
Mixed cupola cast.	63.00 to 64.0
Charging box cast.	59.00 to 60.0
Stove plate	62.00 to 63.0
Stove auto cast.	60.00 to 61.0
RR. malleable	70.00 to 75.0
Small indus. malleable	47.00 to 49.0
Low phos. plate	48.00 to 50.0
Scrap rails	58.00 to 60.0
Rails 3 ft & under	63.00 to 64.0
RR steel wheels	58.00 to 60.0
Cast iron carwheels	58.00 to 60.0
RR. coil & leaf spgs.	58.00 to 60.0
RR. knuckles & coup.	58.00 to 60.0

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.00 to \$43.50
No. 2 hvy. melting	42.00 to 42.50
No. 1 bundles	42.00 to 42.50
No. 1 busheling	42.00 to 42.50
Drop forge flashings	42.00 to 42.50
Mach. shop turn.	37.00 to 37.50
Shoveling turn.	38.50 to 39.50
Steel axle turn.	42.00 to 42.50
Cast iron borings	37.50 to 38.50
Mixed bor. & turn.	36.50 to 37.50
Low phos. 2 ft and under	47.00 to 47.50
No. 1 machinery cast.	72.00 to 74.50
Malleable	79.00 to 81.00
RR. cast.	76.00 to 77.00
Railroad grate bars	60.00 to 62.00
Stove plate	61.00 to 63.00
RR. hvy. melting	43.00 to 43.50
Rails 3 ft and under	63.50 to 64.50
Rails 18 in. and under	65.00 to 66.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	\$36.00 to 40.00
No. 1 cupola cast.	50.00 to 51.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$27.50
No. 2 hvy. melting	27.50
No. 1 bales	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
No. 1 cupola cast.	\$45.00 to 50.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	\$27.50 to \$30.00
Elec. fur. 1 ft and under	36.50 to 40.00
No. 1 cupola cast.	40.00 to 45.00
RR. hvy. melting	28.50

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point:

Heavy melting	\$22.00*
No. 1 bundles	22.00*
No. 2 bundles	21.50*
Mechanical bundles	20.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remelting	23.00*
Rails, rerolling	26.00*
Bushelings	17.00*
Bushelings, new fact, prop'd.	21.00*
Bushelings, new fact, unprop'd.	16.00*
Short steel turnings	17.00*
No. 1 cast	\$42.00 to 46.00
No. 2 cast	35.00 to 37.00

*Ceiling Price.

*For the Purchase or Sale
of Iron and Steel Scrap...*

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(cents per pound)	1948	1948	1948	1947
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50

Tin and Terneplate:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(dollars per base box)				
Tinplate (1.50 lb) cokes	\$6.80	\$6.80	\$6.80	\$5.75
Tinplate, electro (0.50 lb)	6.00	6.00	6.00	5.05
Special coated mfg. ternes	5.90	5.90	5.90	4.90

Bars and Shapes:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.25	28.25	28.25	26.00
Wrought iron bars	9.50	9.50	9.50	7.15

Wire:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(cents per pound)				
Bright wire	4.256	4.256	4.256	3.55

Rails:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(dollars per 100 lb)				
Heavy rails	\$3.20	\$3.20	\$3.20	\$2.75
Light rails	3.55	3.55	3.55	3.10

Semifinished Steel:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(dollars per net ton)				
Rerolling billets	\$52.00	\$52.00	\$52.00	\$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†

Wire rod and Skelp:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(per gross ton)	1948	1948	1948	1947
No. 2, foundry, Phila.	\$49.56	\$49.56	\$49.26	\$41.22
No. 2, Valley furnace	43.50	43.50	43.50	36.50
No. 2, Southern Cinti.	48.14	48.14	48.14	39.75
No. 2, Birmingham	43.38	43.38	43.38	34.88
No. 2, foundry, Chicago†	43.00	43.00	43.00	36.00
Basic del'd Philadelphia	48.76	48.76	48.76	40.72
Basic, Valley furnace	43.00	43.00	43.00	36.00
Malleable, Chicago†	43.50	43.50	43.50	36.50
Malleable, Valley	43.50	43.50	43.50	36.50
Charcoal, Chicago	69.55	69.55	69.55	49.49
Ferromanganese†	145.00	145.00	145.00	135.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
‡ for carlots at seaboard.

Scrap	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(per gross ton)				
Heavy melt'g steel, P'gh.	\$42.75	\$42.75	\$42.75	\$37.75
Heavy melt'g steel, Phila.	45.00	45.00	45.00	36.75
Heavy melt'g steel, Ch'go	41.75	41.75	41.75	38.75
No. 1, hy, comp. sh't, Det.	38.00	38.00	38.00	34.50
Low phos. Young'n.	47.75	47.75	47.75	44.50
No. 1, cast, Pittsburgh	70.00	65.00	65.00	43.00
No. 1, cast, Philadelphia	65.50	65.50	65.50	47.50
No. 1, cast, Chicago	71.00	71.00	74.50	49.50

Coke, Connellsville:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(per net ton at oven)				
Furnace coke prompt	\$15.00	\$15.00	\$15.00	\$12.00
Foundry coke, prompt	17.00	17.00	17.00	13.75

Nonferrous Metals:	Sept. 21, 1948	Sept. 14, 1948	Aug. 24, 1948	Sept. 23, 1947
(cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	\$1.03	\$1.03	\$1.03	\$0.80
Zinc, East St. Louis	15.00	15.00	15.00	10.50
Lead, St. Louis	19.30	19.30	19.30	14.80
Aluminum, virgin	16.00	16.00	16.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	37.67
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	35.00	35.00	35.00	33.00

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL (Base Price)	PIG IRON	SCRAP STEEL
Sept. 21, 1948.....3.75255¢ per lb.....	\$44.74 per gross ton.....	\$43.16 per gross ton.....
One week ago.....3.75255¢ per lb.....	\$44.74 per gross ton.....	\$43.16 per gross ton.....
One month ago.....3.75255¢ per lb.....	\$44.52 per gross ton.....	\$43.16 per gross ton.....
One year ago.....3.18925¢ per lb.....	\$36.93 per gross ton.....	\$37.75 per gross ton.....

HIGH	LOW	HIGH	LOW	HIGH	LOW
1948.... 3.75325¢ July 27	3.22566¢ Jan. 1	\$44.74 Sept. 14	\$39.58 Jan. 6	\$43.16 July 27	\$39.75 Mar. 9
1947.... 3.19541¢ Oct. 7	2.87118¢ Jan. 7	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946.... 2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945.... 2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944.... 2.30837¢ Sept. 5	2.21189¢ Oct. 5	\$23.61	\$23.61	19.17 Jan. 11	15.76 Oct. 24
1943.... 2.29176¢	2.29176¢	23.61	23.61	\$19.17	\$19.17
1942.... 2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941.... 2.43078¢	2.43078¢	\$23.61 Mar. 20	\$23.45 Jan. 2	\$22.00 Jan. 7	\$19.17 Apr. 10
1940.... 2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939.... 2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938.... 2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937.... 2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936.... 2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935.... 2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934.... 2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933.... 1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932.... 1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931.... 1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930.... 2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929.... 2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 20¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only. (18) 0.20 to 0.50 carbon.

Base prices at producing points apply to the sizes and grades produced in these areas

PRODUCTS	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio		Detroit	Johns- town	Seattle, S. Frisco, Los Angeles	Fontana
INGOTS															
Carbon forging	\$50.00														
Alloy	\$51.00							(per net ton)							
BILLETS, BLOOMS, SLABS					\$52.00	\$52.00		(per net ton)					\$52.00		
Carbon, rerolling ^{1,2}															
Carbon forging billets	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00		(per net ton)					\$61.00		
Alloy	\$63.00	\$63.00				\$63.00		(Bethlehem, Canton, Massillon = \$63.00) (per net ton)							
PIPE SKELP	3.25						3.25				Warren = 3.25				
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.40			Worcester 3.70		3.40	4.05 ¹³ 4.10 ¹⁴	
SHEETS															
Hot-rolled ⁶	3.25 to 3.30	3.25	3.25	3.25-3.30	3.25	3.25	3.25	3.25		Warren, Ashland = 3.25		3.45		3.95 ¹⁵	5.65
Cold-rolled ¹	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.20	4.00	Warren 4.00	4.20			
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton = 4.40	4.40	Ashland = 4.40			5.15 ¹⁵	
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70			
Long ternes ² (10 gage)	4.80		4.80							4.80					
STRIP															
Hot-rolled ³	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25	5.90
Cold-rolled ⁴	4.00	4.25		4.00	4.00	4.00	4.00	4.00			New Haven 4.00 Warren = 4.00 to 4.25	4.20 to 4.50			7.10 ¹⁸
TINPLATE															
Cokes, 1 50 lb. ⁵ base box	6.80	6.80	6.80		6.90			6.90	7.00		Warren, Ohio = 6.80			Pittsburg, Cal. = 7.55	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct \$1.00, 80¢ and 60¢ respectively from 1.50 lb. coke base box price														
TERNES MFG., special coated	Deduct 90¢ from 1.50 lb. coke base box price														
BLACKPLATE CANMAKING	Deduct \$1.60, \$1.70 and \$1.60 respectively from 1.50 lb. coke base box price														
55 70 lb, 75 95 lb, 100 128 lb															
BLACKPLATE, h.e., 29 ga.¹⁰	4.75	4.75	4.75					4.85							
BARS															
Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton = 3.35		3.35	4.05 to 4.10	5.30
Reinforcing (billet) ⁷	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton = 3.35		3.35	4.05 to 4.10	5.30
Cold-finished ⁸	3.95 to 4.00	4.00	4.00	4.00			4.00					4.30			
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75			Bethlehem, Canton, Massillon = 3.75			3.75	4.80 ¹⁴	5.50
Alloy cold-drawn										Massillon = 4.65					
PLATE															
Carbon steel ¹¹	3.40 to 3.60	3.40	3.40	3.40	3.40 Conshohocken	3.45 Shoeken	3.40 = 3.95			Coatesville = 3.75, Claymont = 3.95 Geneva, Utah = 3.40, Harrisburg = 5.85		3.65	3.45	4.30 ¹⁶	5.80
Floor plates	4.55	4.55		4.55					Conshohocken = 4.55						
Alloy	4.40	4.40								Coatesville = 5.10					
SHAPES, Structural	3.25	3.25	3.25		3.25	3.30				Bethlehem = 3.30, Geneva, Utah = 3.25			3.30	3.85 to 4.30	5.75
MANUFACTURERS' WIRE⁹															
Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25		Duluth = 4.15, Worcester = 4.45			4.15	5.10 ¹³	
Spring (high carbon)	5.20	5.20		5.20				5.30		Worcester = 5.50 New Haven, Trenton = 5.50			5.20	Duluth = 5.20-6.15	
PILING, Steel sheet	4.05	4.05				4.05									

CORROSION AND HEAT RESISTANT STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel		Straight Chromium			
	No. 302	No. 304	No. 410	No. 430	No. 442	No. 446
Billets, forging.....	26.50	27.75	21.50	21.75	25.00	30.25- 30.75
Bars, hot-rolled.....	28.50	30.00	23.00	23.50	27.00	32.50- 33.00
Bars, cold-finished.....	28.50	30.00	23.00	23.50	27.00	32.50- 33.00
Plates.....	32.00	34.00	26.00	26.50	31.00	35.50- 39.00
Shapes, structural.....	28.50	30.00	23.00	23.50	27.00	32.50- 33.00
Sheets.....	37.50	39.50	33.00	35.50	39.50	50.00
Strip, hot-rolled.....	25.75	27.75	21.25	21.75	28.50	45.00
Strip, cold-rolled.....	33.00	35.00	27.00	27.50	39.00	60.00
Wire, cold-drawn.....	28.50	30.00	23.00	23.50	27.00	32.50- 33.00

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	\$1.42
18	4	2	—	—	\$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium 52¢
 Oil harden manganese 29¢
 Special carbon 26.5¢
 Extra carbon 22¢
 Regular carbon 19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢.

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b.		
Coatesville, Pa.	*27.00	
Washington, Pa.	*26.50	*22.50
Claymont, Del.	*26.50	
Conshohocken, Pa.		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville.	36.00	
Monel-clad		
10 pct, f.o.b. Coatesville.	29.00	
Aluminized steel sheets		
Hot dip, 20 gage, f.o.b. Butler, Pa.		9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

Base Column
Pittsburgh,
Calif.

Standard & coated nails* 103	123
Galvanized nails*	103
Woven wire fence†	109
Fence posts, carloads†† ..	114
Single loop bale ties.	106
Galvanized barbed wire** 123	143
Twisted barbed wire... 123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher. † 15½ gage and heavier.
 ** On 80 rod spools, in carloads. †† Duluth only.

Base per Pittsburgh,
100 lb Calif.

Annealed fence wire†.....	\$4.80	\$5.75
Annealed, galv. fencing†.	5.25	6.20
Cut nails, carloads†	6.75	...

† Add 30¢ at Worcester; 10¢ at Sparrows Pt. (less 20¢ to jobbers).

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

Cents per lb

Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 O.H., per 100 lb.....	\$3.20
Joint bars, 100 lb	4.25
Light rails (from billets) per 100 lb	3.55

Base per lb

Cut spikes	5.35¢
Screw spikes	8.00¢
Tie plates	4.05¢
Tie plates, Pittsburgh, Calif.*	4.20¢
Track bolts	7.50¢
Track bolts, heat treated, to rail- roads	8.50¢

*Seattle, add 30¢.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dyn- alloy	HI Steel	Mayari R	Otis- coloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie- Inols, Republic	Republic	Alan Wood	Inland	Bethle- hem	Jones & Laughlin	Youngs- town Sheet & Tube	Great Lakes Steel
Plates.....	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.20	5.65
Sheets									
Hot-rolled....	4.95	4.95	4.95	5.25	4.95	4.95	4.95	4.95	5.25
Cold-rolled....	6.05	6.05	6.05	....	6.05	6.05	6.05	6.05	6.35
Galvanized....	....	6.75	....	....	....	6.75	....	....	....
Strip									
Hot-rolled....	4.95	4.95	4.95	....	4.95	4.95	4.95	4.95	5.25
Cold-rolled ..	....	....	6.05	....	....	6.05	6.05	....	6.35
Shapes.....	....	4.95	....	....	4.95	5.05	4.95	....	....
Beams.....	....	4.95	....	....	....	....	....	....	....
Bars									
Hot-rolled....	5.10	5.10	5.10	....	5.10	5.10	5.10	....	5.40
Bar shapes.....	....	5.10	....	....	5.10	5.10	5.10	....	....

† Pittsburgh, add 0.10c at Chicago and Gary.

PIPE AND TUBING

Base discounts, f.o.b. mills,
steel butt-weld and seamless.
Base price, \$200.00 per net ton.

Standard, threaded and coupled

Steel, butt-weld*	Black	Galv.
¾-in.	46	26½
1-in.	48½	29½
1¼-in.	49	30
1½-in.	49½	30½
2-in.	50	31
2½ and 3-in.	50½	31½

Wrought Iron, butt-weld

¾-in.	+20½	+50
1-in.	+10½	+39
1 and 1¼-in.	+4½	+30
2-in.	+26½	+26½
2½-in.	2	+26

Steel, lap-weld

2-in.	39½	20
2½ and 3-in.	43½	24
3½ to 6-in.	45½	26

Steel, seamless

2-in.	38½	19
2½ and 3-in.	41½	22
3½ to 6-in.	43½	24

Wrought Iron, lap-weld

2-in.	+7½	+34
2½ to 3½-in.	+5	+29½
4-in.	list	+23½
4½ to 8-in.	+2	+25

Extra Strong, plain ends

Steel, butt-weld		
¾-in.	41	22
1-in.	45	26
1¼-in.	47	29
1½-in.	47½	29½
2-in.	48	30
2½ and 3-in.	48½	30½
3-in.	49	31

Wrought Iron, butt-weld

¾-in.	+16	+44
1-in.	+9½	+37
1 to 2-in.	1½	+26

Steel, lap-weld

2-in.	38½	20
2½ and 3-in.	43½	25
3½ to 6-in.	45½	26

Steel, seamless

2-in.	37½	19
2½ and 3-in.	41½	23
3½ to 6-in.	45	26½

Wrought Iron, lap-weld

2-in.	+4½	+30½
2½ to 4-in.	5	+19
4½ to 6-in.	1	+23½

Basing discounts for standard pipe are for threads and couplings. For threads only, butt-weld, lap-weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt-weld, lap-weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap-weld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all butt-weld. On butt-weld and lap-weld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

*F.o.b. Fontana prices average 17 points lower discount (higher price) on black, 14 points on galvanized.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD Gage	Seamless		Electric Weld	
in. in. BWG	H.R.	C.R.	H.R.	C.D.
2 13	19.18	22.56	18.60	21.89
2½ 12	25.79	30.33	25.02	29.41
3 12	28.68	33.76	27.82	32.74
3½ 11	35.85	42.20	34.78	40.94
4 10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	\$106.70
6 to 24-in., del'd N. Y.	103.50 to 108.40
6 to 24-in., Birmingham	93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	120.30
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
¾ in. & smaller x 6 in. & shorter	35
9/16 & ¾ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

¾ in. and smaller	35
9/16 to 1 in. inclusive	34
1½ to 1½ in. inclusive	32
1½ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
¾ in. and smaller	38	..
¾ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1½ in. through 1½ in.	35	37
1½ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	\$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

Pct Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48
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Cap and Set Screws

(In packages)

Pct Off List

Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Set screws, oval points	..
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

FLUORSPAR

Metallurgical grade, f.o.b. uroducting plant.

	Base price per short ton
Effective CaF ₂ Content:	
70% or more	\$35.00
65% but less than 70%	34.00
60% but less than 65%	33.00
Less than 60%	32.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$6.60
Old range, nonbessemer	6.45
Mesabi, bessemer	6.35
Mesabi, nonbessemer	6.20
High phosphorus	6.20

Increases or decreases in freight rates, dock handling charges and taxes after Apr. 1, 1948, are to be added to above prices.

METAL POWDER

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f.	
New York, ocean bags	7.9¢ to 9.0¢
Domestic sponge iron, 98+ % Fe	9.5¢ to 16.0¢
Electrolytic iron, annealed, 99.5+ % Fe	19.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+ % Fe	44.0¢
Hydrogen reduced iron, minus 300 mesh, 98+ % Fe	63.0¢ to 80.0¢
Carbonyl iron, minus 300 mesh, 98%, 99.8+ % Fe	90.0¢ to \$1.75
Aluminum	24.00¢
Antimony	47.67¢
Brass	27.25 to 37.25¢
Copper, electrolytic	33.625¢
Copper, reduced	33.75¢
Cadmium	\$2.55
Chromium, electrolytic, 99% min.	\$3.50
Lead	26.00¢
Manganese	50.0¢
Molybdenum, 99%	\$2.65
Nickel, unannealed	67.00¢
Nickel, spherical, minus 30 mesh, unannealed	61.00¢
Silicon	29.0¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.0¢
Tin	\$1.15
Tungsten, 95%, 99%	\$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	\$14.50 to \$15.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$16.00 to \$18.00
Foundry, Byproduct	
Chicago, del'd	\$23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa., f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Louis, del'd	20.98
Birmingham, del'd	17.86

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Md., Ky., Mo. except Salina, Pa., add \$5)	\$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	11.50

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	\$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	\$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	\$14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Chester	\$69.00

Magnesite Brick

Standard, Balt. and Chester	\$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

	Std. ¾-in. grains
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	\$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	\$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢	\$11.85
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WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled (18 ga. up)	Cold-Rolled (16 gauge)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia.....	\$5.15-	\$6.31-	\$7.27-	\$5.35-	\$6.51	\$5.37-	\$5.09-	\$5.35-	\$6.16-	\$9.14	\$9.29	\$10.54	\$10.69
New York.....	5.71	6.57	7.47	5.66	6.48-	5.50	5.20	5.50	6.26	9.17-	9.32-	10.40-	10.55-
Boston.....	5.40-	6.28-	7.25-	5.58-	6.73	5.78	5.32-	5.53-	6.18-	9.53	9.68	10.77	10.92
Baltimore.....	5.98	6.43	7.73	5.88	6.75-	5.74	5.58	5.63	6.38	9.40-	9.55-	10.84-	10.92-
Chicago.....	5.48-	6.39	7.56-	5.64-	6.79	5.53	5.39-	5.48-	6.24-	9.44	9.59	10.94	11.09
Milwaukee.....	5.64	6.18	7.15-	5.89	6.32	5.53	5.33-	5.59	6.34	9.44	9.59	10.94	11.09
Norfolk.....	5.28	6.18	7.38	5.34	6.15	5.53	5.33-	5.39	6.13	9.44	9.59	10.94	11.09
Cleveland.....	4.85-	5.75-	6.85-	4.85-	6.15	5.10	4.90	4.90	5.70	9.00	9.15	10.40	10.55
Buffalo.....	5.10	5.95	7.05	5.30	6.32	5.22-	5.07	5.07	5.87	9.15-	9.32	10.52-	10.67-
Detroit.....	5.02-	5.92	7.12-	5.02-	6.32	5.27	5.07	5.07	5.87	9.17	9.32	10.52-	10.67-
Cincinnati.....	5.07	5.75	7.22	5.37	6.32	6.00	6.00	6.00	6.00	9.17	9.32	10.52-	10.67-
St. Louis.....	4.98-	5.75 ¹	7.18-	5.02-	6.70	5.35-	5.16-	5.15-	5.70-	9.14-	9.29-	10.54	10.69
Pittsburgh.....	5.20	6.04 ¹	7.24	5.65	6.70	5.54	5.42	5.34	5.95	9.29	9.79	10.75	20.90
Salt Lake City.....	4.85-	5.75-	7.55-	5.55-	6.35	5.45-	5.10	5.15-	5.90-	9.05-	9.40-	10.75	20.90
Omaha.....	5.10	5.85	7.70	5.66	6.35	5.46	5.10	5.20	6.05	9.35	9.50	10.75	10.87-
Birmingham.....	5.20-	6.05-	7.45	5.25-	6.25-	5.50-	5.30-	5.30-	6.02-	9.31-	9.20-	10.72-	10.87-
Houston.....	5.55	6.50	7.45	5.70	6.55	5.55	5.37	5.52	6.07	9.55	9.47	10.95	11.10
Los Angeles.....	5.14-	5.82-	6.97-	5.25-	6.31	5.50-	5.30-	5.30-	6.06-	9.31-	9.50-	10.75-	10.90-
San Francisco.....	5.36 ⁸	6.21 ⁸	7.45	5.62 ⁸	6.31	5.71 ⁸	5.47 ⁸	5.62 ⁸	6.17 ⁸	9.35	9.51	10.76	10.91
Portland.....	5.19	6.04-	7.29-	5.19-	6.49	5.39-	5.24	5.24	6.04	9.34	9.49	10.74	10.89
Seattle.....	4.85-	5.75 ¹	6.95-	5.00-	5.95	5.05-	4.90-	4.90-	5.65-	9.00	9.15	10.40	10.55-
San Francisco.....	4.90	5.75 ¹	6.95-	5.00-	5.95	5.25	5.15	5.10	5.80	9.00	9.15	10.40	10.55-
Portland.....	5.41	6.31	7.30-	5.41	6.31	5.66	5.46	5.46	6.26	9.56	9.71	10.96	11.11
Seattle.....	5.92	6.81	7.61	5.92	6.81	6.17	5.97	5.97	6.77	9.56	9.71	10.96	11.11
Salt Lake City.....	5.05 ¹	6.36	7.45	5.05 ¹	6.36	5.25 ¹	5.00 ¹	5.00 ¹	6.51	9.56	9.71	10.96	11.11
Omaha.....	6.40	7.85 ¹	8.80	6.40	7.85 ¹	6.35	6.20	6.40	7.80	9.80	9.65	10.75	10.95
Birmingham.....	6.30-	7.85 ¹	8.80	6.30-	7.85 ¹	6.35	6.20	6.40	7.80	9.80	9.65	10.75	10.95
Houston.....	6.40	7.85 ¹	8.80	6.40	7.85 ¹	6.35	6.20	6.40	7.80	9.80	9.65	10.75	10.95
Los Angeles.....	5.95 ⁸	7.15 ²	8.05 ²	6.40 ⁸	8.25	6.30 ⁸	5.90	5.90	7.55	10.35 ¹⁵	10.20 ¹⁵	11.75 ¹⁵	11.95 ¹⁵
Portland.....	6.50 ⁴	8.00 ²	8.15 ²	6.85 ⁴	8.25	6.30 ⁴	6.25 ⁴	6.25 ⁴	8.25 ⁴	10.45 ¹⁵	10.30 ¹⁵	11.75 ¹⁵	11.95 ¹⁵
Seattle.....	6.20 ⁴	7.75 ²	8.00	6.55 ⁴	8.25	6.20-	6.15-	6.05 ⁴	8.00 ¹⁴	10.30 ¹⁵	10.40 ¹⁵	11.75 ¹⁵	11.95 ¹⁵
Salt Lake City.....	6.30 ⁴	7.85 ²	8.00	6.65 ⁴	8.25	6.30	6.25	6.15 ⁴	8.10 ¹⁴	10.30 ¹⁵	10.40 ¹⁵	11.75 ¹⁵	11.95 ¹⁵
Omaha.....	6.15-	7.35	7.90-	6.15-	7.35	5.75-	6.65-	6.95-	7.55-	10.30 ¹⁵	10.40 ¹⁵	11.75 ¹⁵	11.95 ¹⁵
Portland.....	8.00	9.01	9.01	7.45	8.45 ²	6.65	7.00	7.25	8.40	10.30 ¹⁵	10.40 ¹⁵	11.75 ¹⁵	11.95 ¹⁵

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb;

strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS: 1000 to 1999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to

9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES						DELIVERED PRICES† (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem.....	44.00	43.38	.....	.....	.....	Boston.....	Everett.....	\$0.50 Arb.	.....	48.75	49.25	.....	.....
Birmingham.....	42.88	43.38	.....	.....	.....	Boston.....	Steelton.....	6.27	50.27	50.77	51.27	51.77	56.27
Buffalo.....	44.00-	44.00-	44.50-	.....	.....	Brooklyn.....	Bethlehem.....	3.90	47.90	.....	.....	.....	.....
.....	48.00*	48.00*	48.50*	.....	.....	Cincinnati.....	Birmingham.....	6.09	48.97	49.47	.....	.....	.....
Chicago.....	43.00	43.00	43.50	44.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland.....	43.00	43.50	43.50	44.00	48.00	Jersey City.....	Bethlehem.....	2.39	46.39	.....	.....	.....	.....
Duluth.....	43.00	43.50	44.00	44.50	.....	Los Angeles.....	Provo.....	6.93	49.93-	50.43	.....	.....	.....
Erie.....	42.50	43.00	43.50	44.00	.....	Mansfield.....	Cleveland-Toledo.....	3.03	45.53-	46.03-	46.53	47.03	.....
Everett.....	.....	48.75	49.25	.....	.....	.....	.....	.....	46.03	48.53	.....	.....	.....
Granite City.....	47.90	48.40	48.90	.....	.....	Philadelphia.....	Bethlehem.....	2.21	46.21	.....	.....	.....	.....
Neville Island.....	46.00	46.50	46.50	.....	.....	Philadelphia.....	Swedeland.....	1.31	51.31	51.81	52.31	52.81	.....
Provo.....	43.00	43.50	.....	.....	.....	Philadelphia.....	Steelton.....	2.81	46.81	47.31	47.81	48.31	52.81
Sharpsville.....	43.00	43.50	43.50	44.00	.....	San Francisco.....	Provo.....	6.93	49.93	50.43	.....	.....	.....
Steelton.....	44.00	44.50	45.00	45.50	50.00	Seattle.....	Provo.....	6.93	49.93	50.43	.....	.....	.....
Struthers, Ohio.....	43.00	.....	.....	.....	.....	St. Louis.....	Granite City.....	0.75 Arb.	48.65	49.15	49.65	.....	.....
Swedeland.....	50.00	50.50	51.00	51.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Toledo.....	42.50	43.00	43.50	44.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Troy, N. Y.....	.....	.....	.....	.....	50.00	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown.....	43.00	43.50	43.50	44.00	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00

pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—\$56.50; f.o.b. Buffalo—\$57.75. Add \$1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$62.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, \$69.55. High phosphorus charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Pa., New York.....\$145
 F.o.b. Birmingham.....\$150
 F.o.b. Niagara Falls, Alloy, W. Va., Westland, Ont.....\$145
 F.o.b. Johnstown, Pa.....\$147
 F.o.b. Rockwood, Tenn.....\$165
 F.o.b. Etina, Pa.....\$148
 \$1.80 for each 1% above 82% Mn; penalty, \$1.80 for each 1% below 78%.
 Briquets—Cents per pound of briquet, freight allowed, 66% contained Mn.
 Eastern Central Western
 Carload, bulk... 8.70 8.95 9.50
 Ton lots... 10.30 10.90 12.80
 Less ton lots... 11.20 11.80 13.70

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Paimerton, Pa.
 16-19% Mn 19-21% Mn
 3% max. Si 3% max. Si
 Carloads.....\$61.00 \$62.00
 F.o.b. Pittsburgh... 55.00 56.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.
 96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
 Carload, bulk... 32
 L.c.l. lots... 34

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
 Carloads... 32
 Ton lots... 34
 Less ton lots... 36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.
 Carloads Ton Less
 0.07% max. C, 0.06% P, 90% Mn... 23.00 24.85 26.05
 0.10% max. C... 22.50 24.35 25.55
 0.15% max. C... 22.00 23.85 25.05
 0.30% max. C... 21.50 23.35 24.55
 0.50% max. C... 21.00 22.85 24.05
 0.75% max. C...
 7.00% max. Si... 18.00 19.85 21.05

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.
 Carload bulk... 7.80
 Ton lots... 9.45
 Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet... 8.75
 Ton lots... 10.35
 Less ton lots... 11.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth \$81.00, foundry, \$82.00; \$81.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.
 Eastern Central Western
 96% Si, 2% Fe... 16.90 17.50 18.10
 97% Si, 1% Fe... 17.30 17.90 18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si, 1 lb Si briquets.
 Eastern Central Western
 Carload, bulk... 5.25 5.50 5.70
 Ton lots... 6.85 7.45 7.75
 Less ton lots... 7.75 8.35 8.65

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.
 Eastern Central Western
 25% Si... 17.50 18.00 18.50
 50% Si... 11.50 12.00 12.50
 75% Si... 11.80 12.10 12.85
 85% Si... 12.50 13.00 14.35
 90% Si... 15.00 15.30 16.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.
 Cast Turnings Distilled
 Ton lots... \$1.85 \$2.70 \$3.40
 Less ton lots... 2.20 3.05 4.20

Ferrochrome (65-72% Cr, 2% max. Si)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.
 Eastern Central Western
 0.06% C... 26.50 26.90 27.00
 0.10% C... 26.00 26.40 26.30
 0.15% C... 25.50 25.90 26.00
 0.20% C... 25.25 25.65 25.75
 0.50% C... 25.00 25.40 25.50
 1.00% C... 24.50 24.90 25.00
 2.00% C... 24.25 24.65 24.75
 65-69% Cr,
 4-9% C... 18.60 19.00 19.15
 62-66% Cr, 4-6% C.
 6-9% Si... 19.45 19.85 20.00
 Briquets—Contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.
 Eastern Central Western
 Carload, bulk... 12.50 12.75 12.85
 Ton lots... 14.00 14.90 15.50
 Less ton lots... 14.90 15.80 16.40

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.
 High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.
 Eastern Central Western
 Carload... 19.70 20.10 20.25
 Ton lots... 21.85 23.15 23.95
 Less ton lots... 23.35 24.65 25.45
 Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.
 Eastern Central Western
 Carload... 25.00 25.40 25.50
 Ton lots... 27.30 27.95 29.15
 Less ton lots... 29.10 29.75 30.95

Chromium Metal

Contract prices, cents per lb. chromium contained carload packed, f.o.b. shipping point freight allowed, 97% min. Cr. 1% max. Fe.
 Eastern Central Western
 0.20% max. C... 97.00 98.50 99.75
 0.50% max. C... 93.00 94.50 95.75
 9.00% min. C... 91.50 93.00 94.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.
 30-35% Ca, 60-65% Si, 3.00% max. Fe
 Cr 28-32% Ca, 60-65% Si, 6.00% max. Fe.
 Eastern Central Western
 Carloads... 16.25 16.75 18.80
 Ton lots... 19.35 20.10 22.25
 Less ton lots... 20.85 21.60 23.75

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.
 16-20% Ca, 14-18% Mn, 53-59% Si.
 Eastern Central Western
 Carloads... 17.50 18.00 20.05
 Ton lots... 19.80 20.65 22.40
 Less ton lots... 20.80 21.65 23.40

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.
 Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.
 Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.
 Eastern Central Western
 Ton lots... 18.00 19.10 21.05
 Less ton lots... 19.25 20.35 22.30

V Foundry Alloys

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn. V-7: 28-32% Cr, 15-21% Si, 14-16% Mn.
 Ton lots... 14.60¢
 Less ton lots... 15.85¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed
 Si 56%, Ti 9%, Ca 5%.
 Ton lots... 17.90¢
 Less ton lots... 19.40¢

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.
 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.
 Eastern Central Western
 Ton lots... 15.75 16.85 18.80
 Less ton lots... 17.00 18.10 20.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed f.o.b. plant
 Niagara Falls, Washington, Pa., York, Pa., per pound contained
 W, 5 ton lots, freight allowed... \$2.25
 Ferrovandium, 35-55%, contract basis, f.o.b. plant freight allowances, per pound contained V.
 Openhearth... \$2.90
 Crucible... 3.00
 High speed steel (Primos)... 3.10
 Vanadium pentoxide, 88-92% V₂O₅ contract basis, per pound
 Contained V₂O₅... \$1.20
 Ferrocolumbian, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb
 Ton lots... \$2.50
 Less ton lots... \$2.55
 Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo... 95¢
 Calcium molybdate, 45-50%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo... 80¢
 Molybdenum oxide briquets, 48- Langeloth and Washington, Pa., per pound contained Mo... 80¢
 Molybdenum oxide in bags, f.o.b. Langeloth and Washington, Pa., per pound contained Mo... 80¢
 Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti... \$1.23
 Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti... \$1.35
 Less ton lots... 1.40
 High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton... \$152.50
 Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton... \$65.00
 10 tons to less carload... 75.00
 Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
 Carload lots... 18.40¢
 Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy.
 Carload, bulk... 6.00¢
 Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.
 Carload... 7.95¢
 Ton lots... 8.85¢
 Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
 Car lots... 10.50
 Ton lots... 11.25

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.
 Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.
 Eastern Central Western
 Ton lot... \$1.20 \$1.21 \$1.23
 Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.
 Ton lots... \$1.89 \$1.903 \$1.935
 Less ton lots... 2.01 2.023 2.055
 Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.
 Less ton lots... \$1.80 \$1.81 \$1.84
 Silcaz, contract basis, f.o.b. plant freight allowed, per pound.
 Carload lots... 39.00¢
 Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.
 No. 1... 93¢
 No. 6... 63¢
 No. 79... 45¢
 Bortam, f.o.b. Niagara Falls
 Ton lots, per pound... 45¢
 Less ton lots, per pound... 50¢
 Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.
 Ton lots, per pound... 8.625¢
 Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B... \$6.25

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Weekly Gallup Polls

(CONTINUED FROM PAGE 135)

are negligible, as shown in the following table:

Presidential Preferences by Age

	Dewey Pct.	Tru- man Pct.	Wal- lace Pct.	Unde- cided Pct.
21-29	46½	35½	7	11
30-49	49½	36	5	9½
50 and over.....	48	37½	4	10½

Comparisons of this table with a similar analysis of institute findings a month before the 1944 elections underscores a major worry facing the Democratic strategists—the defection of young voters to the Republican candidate and also to Wallace.

In recent past elections the tendency was for the appeal of the Democratic Party to be greater among younger people, and for Republican strength to be concentrated more among voters in the older age groups. This is shown in the following table:

Per cent Democratic of Major Party Vote

By Age	1944 Pct.	1940 Pct.	1936 Pct.
21-29 years	58	60	68
30-49 years	53	56	65
50 and over	51	51	56

The defection from the Democratic column from 1944 to today has been much larger proportionately among the younger voters resulting in the narrowing of differences between age groups almost to the vanishing point.

Plant Dispersion Head

Washington

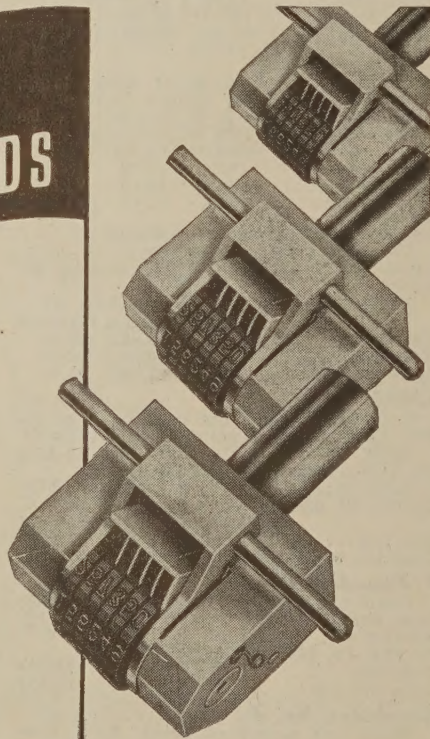
• • • Gayle W. Arnold of Baltimore, well known in the field of railroad industrial development, has been appointed as head of the National Security Resources Board's plant dispersion division. He replaces Fred E. Henderson, who moves up as deputy director of production.

In addition to serving as consultant to the Chief of Ordnance during the war, Mr. Arnold has acted in various capacities with the Baltimore & Ohio, Southern, Chesapeake & Ohio, and Alton Railroad Companies.

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